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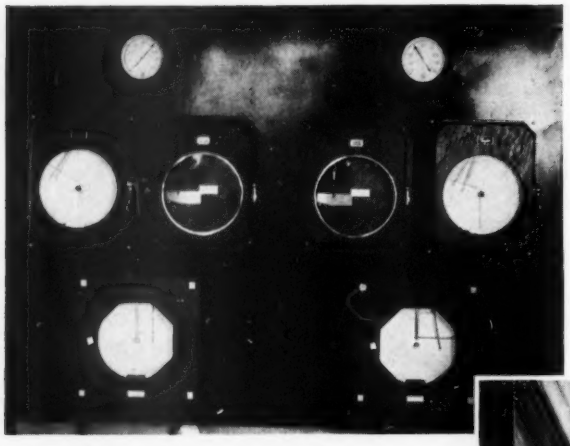
Pulp & Paper

...and they gave the job to Taylor



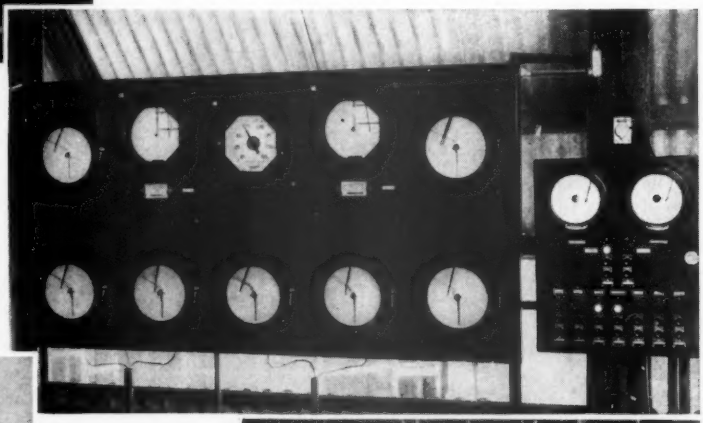
The Great New Pulp and Paper Mill of the Hollingsworth & Whitney Company in Mobile, Alabama, is equipped with Taylor Instruments

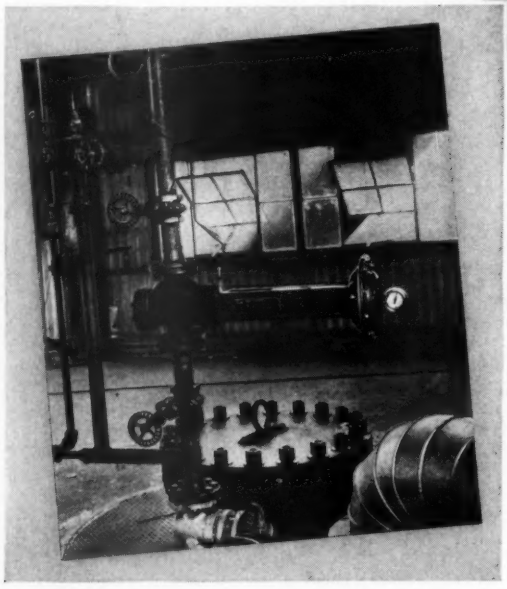
Throughout the whole plant—in most of the production and processing operations—Taylor Instruments specially designed and specified for each application indicate, record, and control variables like temperature, pressure, and liquid level, enabling operators and executives to check, adjust and supervise with precision exactness.

Above. **THIS DIGESTER CONTROL PANEL** (one of two) is a simple, practical installation of Taylor Temperature and Pressure Recorders and Taylor Reset Type Controllers on the four sulphate pulp digesters. "Cookings" can be duplicated exactly, insuring absolute uniformity. Human skill, no matter how expert, just cannot give the same close control of pressure and temperature, the two great variables.

• • •

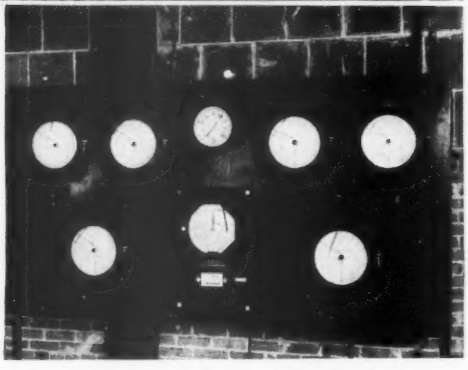
Below. **ONE OF FOUR TAYLOR "EVENACTION" DIAPHRAGM VALVE ASSEMBLIES** in the Digester Control Room.





Above. **IN THE EVAPORATOR ROOM,** five Taylor Liquid Level Recorders and two Taylor Temperature Recorders keep a permanently accurate record of both the inlet and outlet of the condensers—giving a continuous check.

Right. **TAYLOR LIQUID LEVEL RECORDERS** and Temperature Recorders are used in the washer room to keep a constant check on levels in the third washer stock storage tank and the unbleached storage tank.



IN THE liquor heater, Taylor Temperature Recorder-Controllers maintain a definite operation schedule. Both hot and cold water storage tanks are furnished with Taylor Liquid Level Recorders, which make it possible to hold temperature and liquid levels within very close limits. On the six large-capacity beaters, Taylor Beater Roll Pressure Recorders are standard equipment. And Taylor Instruments are recording and controlling other vital processes in the bleaching plant, on the caustic stage mixer, the Jordan Dump chest, the various sewer discharge weirs, and the paper-making machine itself. For full details of *all* these money-saving applications, write Taylor Instrument Companies, Rochester, N. Y. Plant also in Toronto, Canada. *Pacific Coast Sales Office:* 145 Mission Street, San Francisco, California, Central Building, Los Angeles, and Terminal Sales Building, Portland, Oregon.

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Port Mellon Kraft Mill To Resume This Month

Sorg Paper Company of Middletown, Ohio, contracts for entire output for two years with option to purchase mill

● The kraft mill at Port Mellon, British Columbia, will be in production again this month after more than two years' shutdown, and President F. W. Leadbetter, who heads the reorganized company to be known as the Vancouver Kraft Corporation, expects that before the end of the year the plant will be producing about 80 tons of kraft pulp daily.

Following Mr. Leadbetter's announcement of the resumption of operations at Port Mellon, J. A. Aull, president of the Sorg Paper Company of Middletown, Ohio, revealed that his company had signed a two-year contract for the entire output of the Port Mellon plant.

During this two-year period, Mr. Aull stated, Sorg has the option to purchase the pulp mill and the sawmill on the same property. On a 350-day operating basis the Port Mellon kraft pulp mill has a rated capacity of nearly 28,000 short tons or 80 tons per day. It is reported that this can be expanded to 40,000 tons annually with relative ease.

The Sorg Paper Company produces a wide variety of papers including tag boards, duplex papers, waxing, sulphites, sulphate and jute specialties, facial tissue, bond, card index, offset and miscellaneous grades. The Smith Division, one of three, has a single fourdrinier with a trim of 116 inches, producing sulphate specialties including paper for multiwall bags in the amount of 85 tons per day.

When the company was producing in 1937, it depended almost wholly on the Japanese market, which collapsed soon after outbreak of the Sino-Japanese war owing to difficulty in obtaining adequate credits.

The company has opened Vancouver offices in the Standard Bank Building, where Captain A. Ryder is in charge. He held a similar post when the company was last in operation.

Whether the sawmill will resume production on a commercial basis has not yet been determined. For the time being it will be operated only as a breakdown plant for the pulp mill. The sawmill has a rated capacity of about 200,000 board feet per eight-hour shift.

Trig Iverson has been appointed pulp mill superintendent following a visit of inspection to the plant by Mr. Leadbetter and Nels Teren, vice-president. Mr. Leadbetter is president of Columbia River Paper Company, Oregon Pulp & Paper Company, California-Oregon Paper Company and Florida-Oregon Pulp & Paper Company, as well as of the Vancouver Kraft.

Reopening of the Port Mellon plant marks another chapter in the long series of ups and downs experienced by this enterprise, which under one name and management or another has been in existence for some thirty years. Howe Sound Pulp & Wood Company first took control of the property and started construction of a mill.

The mill was started under the management of B. M. Doolittle, and while it produced a good grade of paper it was found that the production costs were excessive and it was decided to carry out extensive alterations to the plant. New brick and steel buildings were erected and new equipment purchased. Then the bottom dropped out of the market in 1929 and the whole project was abandoned.

During the interval that ended in August, 1936, the company passed through a long period of litigation between bondholders, creditors and other interests. Finally Port Mellon Operating Company was formed and, under direction of Mr. Leadbetter, the mill was put in shape to resume operation. Early in 1937 the company started production of kraft and lumber, but six months later with the loss of the Japanese market operations again came to a stop.

Russell Cooper Named Powell River Superintendent

● Russell Cooper, general superintendent of Quebec North Shore Paper Company's mill at Baie Comeau, Ontario, has been appointed by Powell River Company as general superintendent, to succeed Grant M. Fowler, who died recently.

Mr. Cooper will come to the coast to take over his new duties at the British Columbia paper town during the first week in January.

Anacortes Pulp Company Acquires Unbleached Mill

The Anacortes Pulp Company, owned by the Scott Paper Company, acquired the unbleached sulphite pulp mill of the Puget Sound Pulp & Timber Company at Anacortes, Washington, on November 15th.

THE Anacortes Division of the Puget Sound Pulp & Timber Company became the Anacortes Pulp Company on November 15th when title to the mill properties was transferred to the new firm, whose $750,000 capital stock is wholly owned by the Scott Paper Company of Chester, Pennsylvania.

The mill was constructed in 1925 and operated until 1930 as the Fidalgo Pulp Manufacturing Company. In that year the Puget Sound Pulp & Timber Company was organized and the Anacortes plant became the Fidalgo Division. Later, the name was changed to Anacortes Division.

From November 15th forward all the unbleached sulphite pulp produced by the Anacortes mill, nearly 90 tons per day, will be shipped to the Scott Paper Company's plant at Chester for conversion into the famous brands of toilet tissue and towels produced by the company.

William S. Campbell, vice president of the Scott Paper Company, is president of the Anacortes Pulp Company. Mr. Campbell is also president of the Coos Bay Pulp Corporation at Empire, Oregon, unbleached sulphite producer acquired by the Scott Paper Company in June of this year. The Coos Bay and Anacortes mills together are capable of supplying around 160 tons daily of the Scott Paper Company's requirements for unbleached sulphite pulps.

John McKirdy is vice president and general manager of the Anacortes Pulp Company. Mr. McKirdy, who has been with the Scott Paper Company for 15 years, has moved his family from Chester to Anacortes and is in active charge of the mill operations.

Mr. McKirdy attended Northwestern University at Evanston, Illinois, prior to going to work for the Scott Paper Company in the sales department. His first sales work was in Grand Rapids. From there he went to Milwaukee and to Chicago. In 1932 he was placed in charge of the company's sales work in Southern California. After two and a half years Mr. McKirdy was called to

JOHN McKIRDY, Vice-President and General Manager, Anacortes Pulp Company.

Chester to work with the Consumers Representative Corps, an organization set up by the Scott Paper Company to establish quality standards for its products and to see that they are maintained. A second function of the corps is the development of new products. In January of 1935 Mr. McKirdy was placed in charge of the Consumers Representative Corps.

From this work Mr. McKirdy was transferred in Jaunary of 1939 to the manufacturing department as assistant to the general plant manager. It was this work he left to take charge of pulp production at Anacortes on November 15th.

Lewis Is Superintendent

● J. R. Lewis, who has been superintendent of the mill at Anacortes since May 1, 1940, will continue in that capacity under the new owners. For the past thirteen years Mr. Lewis has been with the Puget Sound Pulp & Timber Company at the Bellingham mill. He has worked on practically every job in a sulphite pulp mill, but for the seven years prior to May 1st he was a shift foreman.

Herman L. Hansen is in charge of the office and accounting. Mr. Hansen was transferred from the Coos Bay Pulp Corporation plant at Empire, Oregon.

Taxes Cut Scott Profit

In a recent statement to shareholders Thomas B. McCabe, president of the Scott Paper Company, announced that net earnings available for common shares for the nine months ended September 28, 1940, were $1,096,598, equal to $1.64 per share on 667,941 common shares outstanding at the close of the period. This compares with net earnings of $1,223,735, equal to $1.83 per share on the same basis for the nine months ended September, 1939.

Mr. McCabe further announced that net sales for the period ended September 28, 1940, were the largest ever reported in the company's history, amounting to $15,100,005. This represents an increase of 11 per cent over net sales reported for the nine months ended September 30, 1939, of $13,607,852.

He pointed out that the statement for the first nine months of 1940 shows the provision for federal taxes for the period, computed on the

J. R. LEWIS, Superintendent, Anacortes Pulp Company.

basis of the Second Revenue Act of 1940, amounted to $608,809.00, as compared with Federal taxes of $324,853.00 for the first nine months of 1939.

This is an increase in Federal taxes of $283,956 or 87.4 per cent.

Andy Hawley Married in Seattle

● Andrew D. Hawley, in charge of the Pacific Coast Supply Company's Seattle office, was married in Seattle, November 27th.

The bride was the former Barbara Bowen, daughter of Harry S. Bowen, well known in the pulp and paper industry as vice-president of the Puget Sound Sheet Metal Works of Seattle. It was a double wedding with Mrs. Hawley's sister, Betty, being married to Gordon Anderson of Olympia at the same time.

The double wedding was held at the Westminster Presbyterian Church and was followed by a reception at the Sunset Club. Walter A. Salmonson was one of the ushers. Mr. Salmonson is the son of S. A. Salmonson, assistant superintendent of the Soundview Pulp Company, Everett, and is Washington representative for the Simonds Worden White Company of Dayton, Ohio.

Among the guests were a large number of men from the pulp and paper mills on Puget Sound.

Pacific Coast Bowling Team in the Lead

● The bowling team of the Pacific Coast Paper Mills at Bellingham, Washington, is now leading the industrial league of that city, occupying the same position it held at the close of the season last year.

Captain of the team is Pete Onkels, superintendent. Other members are: Bill Dynes, Joe Hillier, Jeff Marette and Frank Bloch.

Longview Fibre's No. 5 Machine Starts Up

● The Longview Fibre Company's new Beloit fourdrinier kraft paper and board machine went into regular production Sunday, December 8th. This new machine is the fifth paper and board machine installed by the company.

It is 200 inches in width and trims 180 inches. All the latest improvements were included in the design and construction of No. 5. An illustrated article describing the new Beloit machine will be published in the February number.

Everett Bleach Plant In Operation

● The new bleach plant of the Everett Pulp & Paper Company went into operation early in November employing two stages while the original single stage bleach plant was being rebuilt to serve as the third stage of the new three-stage system.

Raymond P. Hill, president of the Pulp Bleaching Company, designed the plant and stayed in Everett for several months prior to its completion, supervising the installation of equipment and the starting of bleaching operations.

Mr. Hill, accompanied by Mrs. Hill, returned to their home in Wausau, Wisconsin, by automobile early in December.

Dr. Rees Visits Coast Mills

● Dr. E. A. Rees, director of felt sales and research for F. C. Huyck & Sons of Albany, New York, was a recent visitor on the West Coast. Arriving in Los Angeles November 12th, Dr. Rees was met by John Fulton, manager of the Pacific Coast Supply Company, representatives for F. C. Huyck. The two men visited most of the mills in California, Oregon and Washington before Dr. Rees left Portland December 6th for his home in Albany.

DeVane Hamilton Dies Suddenly

● DeVane "Dink" Hamilton, technical director of the Everett Mill, Pulp Division, Weyerhaeuser Timber Company, Everett, Washington, died suddenly on the afternon of November 16th while listening to a football broadcast. An autopsy revealed that death was caused by a tumor at the base of the brain.

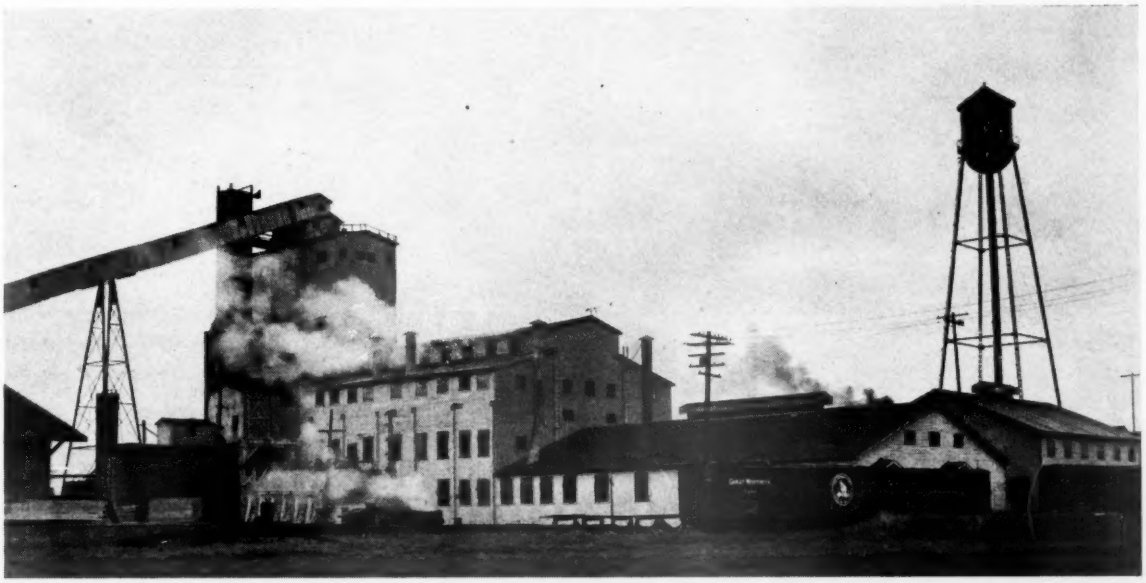
"Dink" Hamilton's passing was a shock to his many friends in the industry. Although a young man of but 31 years, his quiet, friendly manner and ever present sense of humor had developed for him a wide circle of friends. His ability and personality made him a natural leader.

He had been technical director of the Everett mill since October 1st, succeeding Gerald F. Alcorn who was made plant engineer on that date. From the time the Everett mill started operations in the Spring of 1936 until October 1st, Mr. Hamilton had served as assistant technical director.

A graduate in chemical engineering from Washington State College he went to work as a chemist for the Longview Mill, Pulp Division, Weyerhaeuser Timber Company, upon leaving college in 1933. In 1936 he was transferred to Everett, and in 1937-1938 he spent a year as a special student at the Institute of Paper Chemistry in Appleton, Wisconsin.

Services were held in Everett November 19th. Active pallbearers were: Gerald F. Alcorn, G. S. Brazeau; G. R. Torkelson, C. D. Smith of Longview; and Robert Goodrich of Tacoma. Honorary pallbearers included James D. Fraser, Walter Clough, Kenneth Chapman, Paul Pittenger, Gene Killian, and Ray Johnson. Entombment was in the mausoleum at Washelli north of Seattle.

Besides his widow, Geraldine, Mr. Hamilton is survived by a son, William Carlton, 4 years old; his parents, Mr. and Mrs. W. T. Hamilton of Longview; a brother, W. H. Hamilton of Longview; and a sister, Mrs. Robert Upson of Portland, Oregon.



The Unbleached Sulphite Pulp Mill of the ANACORTES PULP COMPANY, Anacortes, Washington, until November 15th the Anacortes Division, Puget Sound Pulp & Timber Company.

St. Regis Adding Two Digesters

To improve pulp quality by lengthening cooking time.

● Pile drivers started work on the morning of November 25th for an extension to the digester building of the St. Regis Paper Company, Kraft Pulp Division, Tacoma, to house two additional kraft digesters. When completed the mill will have six digesters all of the same cubic capacity, 7½ tons. The two new Blaw-Knox digesters will have cone bottoms instead of the dish shaped bottoms of the four now in service.

"The two additional digesters will have almost no effect upon the tonnage produced," said Ossian Anderson, vice-president of the St. Regis Paper Company, in charge of the Kraft Pulp Division, "but they will enable us to employ slower cooking schedules. The result will be improved quality, better color and increased Mullen, tear and fold."

Each of the two new digesters will be equipped with Esco stainless steel circulating systems and stainless heat exchangers made by the Electric Steel Foundry Company of Portland, Oregon. The circulating piping will be made of heavy iron. The stainless steel pump for each digester circulating system will be supplied by the Bingham Pump Company of Portland, and will have a capacity of 2,000 gallons per minute.

Niles M. Anderson, general superintendent of the St. Regis kraft pulp mill, is supervising the construction of the digester building addition and the installation of the new digesters.

Other improvements made in the last few months include a Dorr clarifier, 40 feet in diameter and 20 feet in height, for clarification of white liquor, and a Dorr lime slacker and classifier.

Production is averaging 235 tons daily of fully bleached, semi-bleached and unbleached kraft pulps.

Pile drivers at work on the addition to the digester building of the ST. REGIS PAPER COMPANY, KRAFT PULP DIVISION, Tacoma, which will house two new digesters. Photograph taken December 3rd.

Camas Mill Signs To Tell the World

● The two large neon signs proclaiming the identity of Crown Willamette Paper Company, Division of Crown Zellerbach Corporation at Camas, Washington, are expected to be in operation by the middle of December. Preparations had been made early in the month for hanging the signs pending their completion.

Each of these signs are 82½ feet long and 9 feet high and are to be erected on the bag factory building. They will be placed so the passers-by on the Evergreen highway can observe the signs, regardless of which direction they are traveling on the highway.

Puget Sound Employees To Have Christmas Party

● On the Saturday before Christmas the employees of the Puget Sound Pulp & Timber Company at Bellingham, will gather for the annual Christmas party.

Sponsored by Local 194 of the Brotherhood of Pulp, Sulphite and Paper Mill Workers, the affair will provide fun and gifts for children and adults alike. The program will include moving pictures, games and then the big Christmas tree laden with gifts. Following the children's part of the program the evening will be given over to dancing.

The committee planning the Christmas party includes, Glen MacDonald, Stanley Lewis, Vernon Jones, Karl Knutsen, Sydney Gibson, Ed Whalen, Melvin Bakkom, Carl Anderson, Carl Paulsen and Tom Hutchinson.

Broadcast Story of Newsprint

● On December 9th the Columbia Broadcasting System put on the air "The Story of Newsprint," as part of its series, "Americans at Work."

The program was broadcast to the Eastern listeners in the morning and rebroadcast in the afternoon for the Middle and Far West audience. R. S. Kellog, secretary of the News Print Service Bureau commented that Columbia had gone to a good deal of pains to make an accurate broadcast, taking most of its material from two of the Bureau's publications, "The Story of Ts'ai Lun" and "The Story of Newsprint Paper."

Fibreboard's Chief Chemists Meet in Port Angeles

● Technical chiefs of the five fibreboard mills in the Fibreboard Products corporation's organization held a two-day meeting at Port Angeles December 2 and 3, hearing papers and discussing mutual problems. The occasion was the second annual session of the Fibreboard Technical Association.

Host to the group was the Port Angeles unit of Fibreboard Products, with local arrangements handled by its chief chemist, Nelson Hartnagel. Visitors included Frank Wheelock, chief chemist, and Bruce Brown Jr., assistant chemist, from the Vernon plant; H. L. Rammer, chief chemist, Stockton; E. O'Connor, chief chemist, Antioch, and Bob Vaughn, chief chemist, and Mark Sanford, assistant manager, from Sumner.

Paper Men Hunt In Cariboo District

● A sharp decline in the wild life population of the Cariboo region of British Columbia was noted after a party from the Pacific Coast Paper Mills at Bellingham and the Westminster Paper Company, Ltd., of New Westminster, B. C., passed through the territory.

Two moose, two deer and the full limit of both upland and waterfowl were shot by the party made up of J. J. Herb, president of both companies, F. J. "Bill" Herb of the Pacific Coast Paper Mills sales department in Seattle; Pete Onkels, superintendent at Bellingham, and F. F. Foote, treasurer and purchasing agent of the Westminster Paper Company, Ltd.

Not quite satisfied with the results of the Cariboo trip, Pete Onkels journeyed over to the Pasco district in south central Washington to try for wild geese.

Crown Zellerbach Prepares School Display

● At the request of A. B. Campbell, assistant superintendent of the Berkeley public schools, W. D. Welsh of the executive offices of the Crown Zellerbach Corporation has arranged a most interesting exhibit of pulp making to travel through the Berkeley schools and to be viewed by 12,000 school children.

The exhibit was assembled at the Camas mill of the corporation. It consists of three wooden blocks, one each of white fir, western hemlock, and Sitka spruce; a vial of chips; a vial of sulphur; a vial of lime rock; a vial of sulphite cooking liquor; a vial of unbleached sulphite pulp, and a vial of bleached sulphite stock.

Fernstrom to Shut Down for Overhaul

● During the holidays the Fernstrom Paper Mills, Inc., of Pomona, Calif., will undergo its customary annual overhaul of its paper machines. At this time installation will be made on No. 2 machine of a top soft rubber couch roll, which was made in Portland, and a bottom grooved couch roll. The latter roll was made by Black-Clawson Company at Hamilton, Ohio.

According to Charles Framtpon, superintendent of the mill, the new de-inker installation is rapidly being completed, and with the placement of a few more feet of pipe will be completed for tests.

R. J. LeRoux New Superintendent Weyerhaeuser Everett Mill

● The announcement was made early in December by G. S. Brazeau, manager, Everett mill, Pulp Division, Weyerhaeuser Timber Company, of his appointment of Russell J. Le Roux as superintendent to succeed James D. Fraser, who resigned December 1st.

Mr. Le Roux will assume his new duties at the Everett unbleached sulphite pulp mill on January 1st. For the past eleven years he has been sulphite superintendent of the Interlake Mill of the Consolidated Water Power and Paper Company at Appleton, Wisconsin, which produces approximately 145 tons daily of the bleached and unbleached Mitscherlich sulphite pulp.

His experience has combined the practical with the technical and embraces both pulp and paper making. Mr. Le Roux attended the University of Wisconsin and Lawrence College, majoring in chemistry. During summer vacations he worked for the Nekoosa-Edwards Paper Company in the sulphite mill and on the paper machines. After leaving Lawrence College he worked at Port Edwards, Wisconsin, for a year and a half in the sulphite and paper making departments before joining the Consolidated Water Power & Paper Company at Appleton as a chemist. In 1926 and 1927 he was in charge of the laboratory and in the latter year became assistant sulphite superintendent. Two years later he was made sulphite superintendent.

Mr. Le Roux is a member of the American Pulp and Paper Mill Superintendents' Association and also of TAPPI.

RUSSELL J. LE ROUX, Superintendent, Everett Mill, Pulp Division, Weyerhaeuser Timber Company

Death Takes General Fleming of Columbia River

● Brigadier-General Adrian Sebastian Fleming, D. S. M., vice president of Columbia River Paper Mills, died December 1st, at his country home near Parkdale, Oregon.

General Fleming was born in Kentucky on December 6, 1872. He was appointed to the United States military academy from his native state, graduating with high rank in the class of 1895. A brilliant military career followed, until he retired from military service in 1921.

In 1925 General Fleming was made vice president of the Columbia River Paper Mills, the position he held until his death.

Military funeral services were held at the Portland Crematorium, December 4. Honorary pallbearers were General Charles H. Martin, Colonel George M. Parker, Lieutenant-Colonel C. R. Moore, Major T. M. Osborne, Major D. J. Leehey, F. W. Leadbetter, T. D. Honeyman, E. C. Greele, George L. McPherson, C. R. Peck, N. G. Teren and A. M. Cronin, Jr.

Guest Speakers At Camas School

● Among the guest speakers scheduled to appear before the various classes at the Camas paper school this month are some of the leaders of their respective fields on the coast.

December 4th—M. Lowell Edwards of the engineering department of the Pulp Division Weyerhaeuser Timber Company, Longview, Washington, spoke to the senior class on "Hydraulics, Pumps and Pumping."

December 10th—R. S. Hatch, research director for the Weyerhaeuser Timber Company, spoke on "Pulp Bleaching" to the first year students.

December 11th—R. E. Chase of Tacoma, and R. E. Chase, Jr., of Portland, both of the R. E. Chase & Co., lectured to the third year students on "Combustion and Power Plants."

To date 365 students have enrolled in the paper courses at Camas. Of these 34 are in the fourth year class, 66 in the third, 75 in the second and 190 enrolled in the first year class.

Dr. Hoffman Now With Fitchburg Paper

● Dr. Walter F. Hoffman, technical director of the Northwest Paper Company, Cloquet, Minnesota, left December 1st to become associated with the Fitchburg Paper Company, Fitchburg, Mass., in a similar capacity.

Superintendents Hold Seventh Anniversary Meeting in Longview

Niles Anderson elected Chairman of the Pacific Coast Division for 1941.

SEVEN years ago this month, December 1st and 2nd, 1933, the first official meeting of the Pacific Coast Division of the American Pulp & Paper Mill Superintendents Association was held at the Hotel Monticello in Longview, Washington.

On this seventh anniversary the Superintendents met again in Longview at the Hotel Monticello on December 6th and 7th. During the intervening years the group has grown from twenty-eight to over a hundred members and has held fifteen meetings. One hundred and twenty-one attended the latest meeting of the Superintendents in Longview, ninety-five men and twenty-six ladies. Of the ninety-five men twenty-nine were present at the meeting in Longview seven years before.

Three of the first officers of the Pacific Coast Division were there, H. Robert Heuer, the first chairman; G. J. Armbruster, the first vice chairman; and H. A. Des Marais, secretary - treasurer. The Pacific Coast Division was formally organized on September 9, 1933, at a meeting in Seattle at the Olympic Hotel and the above officers were elected together with Ferdinand Schmitz, second vice chairman and Henry C. Reimer, third vice chairman.

MERRILL E. NORWOOD, First Vice Chairman, Pacific Coast Division

NILES M. ANDERSON, Chairman, Pacific Coast Division

Among the group of approximately twenty men present at the organization meeting in Seattle, were two past presidents of the national organization, the late James Ramsey and Ben Larrabee. Others who took part in organizing the new group were, Bob Heuer, a past chairman of the Northern New York Division, now the New York and Canadian Division, Henry Reimer, Ferdie Schmitz, "Gob" Des Marais, George Cropper, Arthur Zimmerman, Mr. McAuley, Bob Petrie, Sigurd Norman, Al Quinn, Walter Hodges and Dan Charles. Four ladies were present, Mrs. Larrabee, Mrs. Ramsey, Mrs. Hodges and Mrs. Petrie.

There was no official registration so the foregoing list is incomplete. Congratulatory messages were read from Fred C. Boyce, the "father" of the Superintendents Association; Herbert T. Randall, then president of the national organization, D. Clark Everest and R. B. Wolf. It was decided to hold the first official meeting in Longview in December.

These seven years have witnessed much progress in the industry and it has been reflected in the growth and interest in the Pacific Coast Division of the American Pulp & Paper Mill Superintendents Association. Greater cooperation has developed between the various mill organizations.

The December Meeting

● The meeting held December 6th and 7th at Longview was in charge of Anton Siebers, chairman of the Pacific Coast Division and paper mill superintendent of the Longview Fibre Company. In planning the program and making the arrangements he was assisted by Niles M. Anderson, vice chairman and general superintendent of the St. Regis Paper Company, Kraft Pulp Division, Tacoma; and A. S. Quinn, secretary-treasurer and vice president of the Stebbins Engineering Corporation, Seattle.

Mrs. Carl Fahlstrom served as chairman of the Ladies Committee, and was assisted by Mrs. George H. McGregor and Mrs. Preston Varney.

Friday noon, December 6th, registration opened and a large number were on hand to sign up. The afternoon was spent in visiting the three mills in Longview, the Pacific Straw Paper & Board Company, the Longview Fibre Company and the Pulp Division of the Weyerhaeuser Timber Company. The men primarily interested in pulp visited the Weyerhaeuser mill first while the paper men hurried to the Longview Fibre Company to accept manager R. S. Wertheimer's invitation to see the new Beloit fourdrinier board machine which was just starting up.

As the first fourdrinier kraft

GEORGE H. McGREGOR, Second Vice Chairman, Pacific Coast Division

board machine on the Pacific Coast it is creating much interest. A full, illustrated description of Longview Fibre's latest unit will appear in the February number of Pacific Pulp & Paper Industry.

In the evening the informal get-together party was held in the Monticello ballroom and dancing was in order until midnight.

Saturday Breakfast

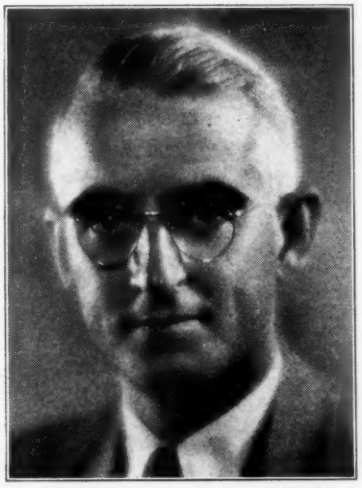
● The stag breakfast has become a custom at the Superintendents' meeting and Zana ("Zink") Wise has become the permanent "waker-upper" as toastmaster. Most of the men were on tap at 8 a.m. but quite a few at that didn't realize that 8 a.m. means just that so they were forced to contribute fines to the treasury.

Toastmaster Wise staged an "Information Please" program and had a bag full of nonsensical questions about pulp and paper making. It was his intention to pay out the fines taken from those coming late as prizes for the right answers to the questions, but the correct ones were not forthcoming in so many cases that the Superintendents' treasury kept most of the fine money.

Breakfast over, everyone was present for the business meeting at 9:15 a.m. Niles Anderson, first vice chairman, presided. First on the program was J. E. Goodwillie, engineer, Beloit Iron Works, Beloit, Wisconsin, who was present in Longview supervising the installation of the new 200-inch paper and board machine in the Longview Fibre Company's mill.

Mr. Goodwillie described the machine and then answered questions concerning its features and about a number of recent developments and practices in paper machine building. His remarks were made extemporaneously.

Following Mr. Goodwillie's talk a sound moving picture was shown, "The Story of Neoprene, The Chemical Rubber," through the courtesy of the Chemical Rubber Division of the E. I. du Pont de Nemours & Company. The picture portrayed the qualities of neoprene, a synthetic rubber, not possessed by natural rubber, and showed a large number of industrial and household products where these qualities gave longer life.



CHARLES G. FRAMPTON, Third Vice Chairman, Pacific Coast Division

New Officers

● The Pacific Coast Division held its annual business meeting on Saturday morning. The nominating committee, W. A. Kelly, Ray C. Onkels and H. R. Heuer, reported the following nominations which were unanimously adopted.

For chairman in 1941: Niles M. Anderson, general superintendent, St. Regis Paper Company, Kraft Pulp Division, Tacoma.

For first vice chairman: Merrill E. Norwood, paper mill superintendent, Columbia River Paper Mills, Vancouver, Washington.

For second vice chairman, George H. McGregor, general superintendent, Longview Mill, Pulp Division, Weyerhaeuser Timber Company, Longview.

For third vice chairman: Charles G. Frampton, superintendent, Fernstrom Paper Mills, Inc., Pomona, California.

For secretary - treasurer: A. S. Quinn, vice president Stebbins Engineering Corporation, Seattle.

For membership on the finance committee: Norman A Lewthwaite, pulp mill superintendent, Crown Zellerbach Corporation, Port Townsend Division, Port Townsend, Washington; and H. A. DesMarais, Pacific Coast Manager, General Dyestuff Corporation, San Francisco. Mr. Des Marais is a past secretary - treasurer having served four years.

Niles Anderson

● The newly elected chairman of the Pacific Coast Division of the American Pulp & Paper Mill Superintendents Association, Niles M. Anderson, is general superintendent of the St. Regis Paper Company, Kraft Pulp Division, Tacoma. His experience includes both sulphite and sulphate pulping. Following graduation from the College of Forestry, University of Washington, Mr. Anderson worked on the construction of the sulphite mill at Anacortes, Washington, then called the Fidalgo Pulp Manufacturing Company, later the Anacortes Division of the Puget Sound Pulp & Timber Company, and since November 15th of this year the Anacortes Pulp Company. Later he became assistant superintendent of this plant. When construction of the Bellingham sulphite mill, then the San Juan Pulp Manufacturing Company and now the Puget Sound Pulp & Timber Company, was begun Mr. Anderson became sulphite superintendent and took part in supervising the installation of the machinery and in starting up the mill.

He became sulphite superintendent of Pacific Mills, Limited, at Ocean Falls, B. C., in 1927. During his more than five years at Ocean Falls, Mr. Anderson supervised both the sulphite and sulphate pulp production. He was transferred to the Camas, Washington, mill of the Crown Willamette Paper Company as night sulphite superintendent. In a short time he moved to Vancouver, Washington, and became sulphite superintendent for the Columbia River Paper Mills. During his stay of three years he supervised groundwood production as well as sulphite. In September of 1936 Mr. Anderson became assistant superintendent of the St. Regis Kraft Company bleached kraft pulp mill in Tacoma, upon the completion of the modernization program and the resumption of operations. In January of this year he was named general superintendent.

Merrill E. Norwood

● Merrill E. Norwood, first vice chairman of the Pacific Coast Division, is paper mill superintendent of the Columbia River Paper Mills at Vancouver, Washington. He has had extensive experience in paper manufacturing starting with the International Paper Company at Glen Park, New York, in the Bureau of Tests. After five years at Glen Park he was transferred to International's plant at Bangor, Maine, and spent a year there as backtender. Then he moved to the St. Regis Paper Company's mill at Deferiet, New York, as backtender and remained there for two years, coming to the Pacific Coast in January, 1920. His first work on the West Coast was as backtender at the Crown Willamette Paper Company's mill at Camas. After two years he went

A. S. QUINN, Reelected Secretary-Treasurer, Pacific Coast Division

ANTON SIEBERS, Retiring Chairman, Pacific Coast Division

to Powell River, B. C., as backtender. Two years in Powell River and he left for Camas again where he stayed for over six years.

Then followed two years as machine tender for the Hawley Pulp & Paper Company at Oregon City and a six months' stay at Camas as machine tender before he joined the Columbia River organization in 1936 as machine tender. On August 1, 1937, Mr. Norwood was made paper mill superintendent.

George H. McGregor

● Second vice chairman of the Pacific Coast Division for 1941 is George H. McGregor, superintendent of the Longview Mill, Pulp Division, Weyerhaeuser Timber Company. Mr. McGregor graduated from the University of Wisconsin in 1925 with the degrees of B.S. and M.S. in chemical engineering. From 1925 until 1928 he was with the Northwest Paper Company in Cloquet, Minnesota, as a chemist. In the latter year he was awarded the company's fellowship in graduate study at the University of Wisconsin.

Upon completition of this study in 1929 he returned to the Northwest Paper Company and was placed in charge of their laboratories. In 1931 he resigned to become an instructor in pulp and paper manufacture at the Institute of Paper Chemistry in Appleton, Wisconsin. Three years later he left to join the Weyerhaeuser organization in Longview. From 1934 until May 1, 1938, Mr. McGregor served Weyerhaeuser in several capacities includuing that of technical director. On that date he was appointed superintendent by W. Norman Kelly, manager of the Longview mill.

Mr. McGregor has taken an active part in the Superintendents and TAPPI organizations on the Pacific Coast, serving the latter group in 1937 as vice chairman and in 1938 as chairman of the Pacific Section.

Charles G. Frampton

● Charles G. Frampton, superintendent of the Fernstrom Paper Mills, Incorporated, Pomona, California, has had a broad experience in paper manufacturing in the East, Middle West and on the Pacific Coast. Mr. Frampton was elected third vice chairman.

Albert S. Quinn

● Albert S. Quinn, who was reelected secretary-treasurer, is a graduate in civil engineering from Cornell University. In 1930 he came to the Pacific Coast as manager for the Stebbins Engineering & Manufacturing Company, and in 1937, when the subsidiary company, Stebbins Engineering Corporation, was formed, he was elected vice president.

Mr. Quinn was elected secretary-treasurer of the Pacific Coast Division in December, 1937, to succeed H. A. Des Marais who had served in that capacity since the division was organized in 1933. Mr. Quinn was reelected in 1938, 1939 and again at the meeting in Longview this month.

The Saturday Luncheon

● The ladies joined the men at luncheon Saturday. H. A. "Gob" Des Marais, a member of the Superintendents' Association and past secretary-treasurer of the Pacific Coast Division, was toastmaster.

Anton Siebers, 1940 chairman of the Pacific Coast Division, who had made arrangements for the Long view meeting, had come down with influenza, Mr. Des Marais told the group, and was unable to take part in the program on Saturday, although he had been present the evening before. Tony Siebers had asked him, Mr. Des Marais said, to express his regret as being unable to be present.

The scheduled speaker at the luncheon was Robert B. Wolf, manager, Pulp Division, Weyerhaeuser Timber Company, but business had called him to New York and he was forced to express his regrets through Mr. Des Marais at his inability to attend.

Albert H. Hooker was called upon to lead the singing and he chose, "For He's a Jolly Good Fellow," in honor of Tony Siebers. The crowd sang lustily for Tony.

Entertainment was provided by the string ensemble from the R. A. Long High School in Longview and nine girls from the school's girls' glee club sang several songs.

The Round Table Discussion

● At 2 p.m. the Round Table Discussion was called to order with Chairman Niles M. Anderson and First Vice Chairman Merrill E. Norwood presiding. This discussion, the highlight of the Superintendents' meetings, lasted until well after 5 o'clock.

● At the afternoon Round Table Discussion a great many questions concerning pulp and paper making were discussed. The following lists include only those questions that were submitted in advance and given to the superintendents in mimeographed form upon registration. Time did not permit the discussion of all questions submitted. Other questions were submitted from the floor.

Questions on Pulp Making

1. What method of testing will give the best evaluation of kraft pulp as regards to strength and paper-making qualities.

2. What is the most satisfactory degree of sulphidity in kraft cooking liquor, and how can sulphur best be introduced to raise sulphidity.

3. Just what advantages are gained by chip-weighing, if any. Is it worthwhile? Or is it one of those things nice to do but not warranting cost of installation plus continuing cost of testing, recording data, etc.

4. What makes sulphite digesters blow dirty and how to blow them clean.

5. What is the best material for sulphur melting coils.

6. What is considered the best packing for bleach liquor pumps and valves.

7. What changes take place in cooking acid in changing over from direct cooking to indirect and vice versa.

8. What is the most desirable size chip for pulping.

9. What relationship exists between sulphur consumption and screenings production.

10. What value is a cold acid test made at the time of a blow in sulphite production.

11. How strong can bleach liquor be made economically.

12. How can bleach liquor storage losses of chlorine be reduced, and what can be done to control them.

13. How many batches of bleach liquor can be made advantageously before discharging the sludge.

14. What is the effect of delayed washing of pulp in blowpit.

15. With circulation systems, can the digester liquor be drained off as such prior to blowing digester with steam or air pressure.

16. What is now considered the best method for determining the evaluation of groundwood pulp fibers. Undoubtedly some Pacific Coast mills have had experience along this line, and what are the opinions of the superintendents regarding the results obtained. Also what is considered the best equipment to use for these determinations.

17. What screen perforations would be recommended in screening groundwood pulp through Impco knotters and Impco fine screens for a bathroom tissue grade of pulp, requiring a screened pulp freeness of 90 freeness, Canadian Stand.

18. What extreme temperatures are attained in grinding wood on a pulpstone. Is there correlation between the extreme temperature of the stone's grinding surfaces and that of the pulp leaving the grinder.

19. In the presence of black liquor at high temperatures, does calcium carbonate scale form either more or less readily on tubes of stainless steel than on those of ordinary or plain steel.

20. In the cooking of a strong kraft pulp that can still be bleached, what proportion of the cook and what period of the cook should be carried on with indirect steaming.

Questions on Paper Making

1. What methods of testing will give the best evaluation of kraft pulp as regards strength and paper making qualities.

2. Wet edges on paper machine top dryer felts; what to do about preventing.

3. What factors effect the degree of rosin sizing and how can satisfactory sizing be insured at all times.

4. What stock treatment, machine operation, pH and sizing, finish, and etc., are best for developing high tensile strength.

5. At what degree of freeness does stock start to dry harder.

6. Sizing and beater treatment of butcher's paper?

7. Where do we stand today in regard to equipment and methods available for continuous stock preparation.

8. What results are now being obtained by cotninuous methods of treatment.

9. Undoubtedly some of the superintendents have had considerable experience with asbestos dryer felts. Have any used asbestos dryer felts, particularly on high-speed newsprint machines, in both the top and bottom wet and dry end positions. Some mills are using the asbestos dryer felts in the dry end position only, and why. Isn't it the natural tendency that an asbestos dryer felt will require more steam for drying a ton of paper than by the use of the conventional type of cotton dryer felt?

10. On high-speed paper machines, with speed 1000 feet per minute and over what is the best setting for the top rolls on the first and second presses. How much off center should the top roll sit. What effect does off-setting have on the felt and sheet.

Stock Preparation

11. Discuss the best methods of stock agitation for storage chests for:
   a. Sulphite.
   b. Kraft.
   c. Groundwood.

12. Discuss beater and jordan tackle on the following grades:
   a. Kraft Wrapping and Bag.
   b. Toweling.
   c. Carbonizing Tissue.
   d. Fruit Tissue.

13. Discuss kinds of pumps most satisfactory for:
   a. Machine chest.
   b. Beater chest.
   c. Raw stock to beaters.

14. Discuss admission of alum to the system on the following grades:
   a. Kraft Wrapping and Bag.
   b. Tissue.
   c. Butcher Wrap.
   d. Test Liner.

Tissue and Toweling

15. What methods are available for the elimination of shell marks.

16. What is the difference in moisture content of the sheet leaving a grooved couch as against a plain couch.

17. Discuss the merits of machine crepe vs. water crepe (converting operation) as to quality of product and economy of operation.

18. Discuss proper vacuum to carry on flat boxes on 9 pound Tissue.

19. Discuss type and cut of screen plates for tissue.

General

20. Discussion of dual press vs. conventional press in manufacture of:
   a. Kraft Wrapping and Bag.
   b. Light Weight Kraft.
   c. Other Grades.

21. Discussion of wire shake covering the following points:
   a. Effect of shake on News.
   b. Effect of shake on Kraft.
   c. Position, amplitude, and rapidity of shake related to speed.

22. Discussion of causes of scuffing on Kraft bag paper.

23. Discussion of effect on pH on wrapping and bag stocks for elimination of foam and prevention of sticking at presses.

24. Discussion of reuse of filtrate from machine saveall.

25. Effect of size of hole, depth and angle of countersink in couch roll drilling on:
   a. Wire life.
   b. Water removal.
   c. Shadow marks.

26. Discussion of use of high pressure water in cleaning of suction rolls and general mill cleaning.

27. What is the preferred plastometer of wringer rolls and at what nip pressure may they be run.

28. Discussion of deckle straps vs. "no deckle device" in the operation at various speeds.

Yankee Machines

29. What is the optimum moisture content of an M. G. sheet at the marking position to secure prominence of mark and best finish.

30. Are there any advantages in predrying an M. G. sheet entirely from one side instead of from both sides.

31. Are there any advantages in placing the felt side of the sheet against the M. G. dryer compared to the conventional practice of placing the wire side against the M. G. dryer.

32. Is there any one type of M. G. dryer doctor blade that has all the following properties:
   a. Will not scratch the dryer.
   b. Will polish the dryer.
   c. Will wear uniformly and not too fast.

33. Discuss the effect of pressure roll on M. G. waxing sheet.

34. Discuss the advantages based on actual operating experience of high pressure drying.

News

35 **Calendar Roll Crowning**

How much crown should be carried in an eight roll calendar stack carrying a total weight of 101 tons. The bottom roll is 34" diameter; the intermediate roll is 20"; and, the remaining rolls are all 18" diameter. The third and fifth rolls from the bottom are steam rolls and are or have been ground straight, without crown. The bottom roll is crowned 53/1000; the intermediate 2/1000; the fourth 3/1000; the sixth 2.5/1000 and the seventh roll has 5/1000 inch crown. All rolls are chilled cast iron with 226 inch face. The sheet bags quite noticeably going into the last nip between the bottom roll and the intermediate, and causes calender cuts when equilibrium moisture is maintained. When stack is shut down after having been run, the 53/1000 inch crown usually shows expansion to 57.5/1000 inch. Is there too much crown in this stack, and if so, what roll is causing the bagging and calender cuts. The machine speed is slightly over 1200 feet per minute.

36. **Foam on News Machine**

What causes tend to effect foaming on a Newsprint Machine where the pH is maintained in the neighborhood of 5.0?

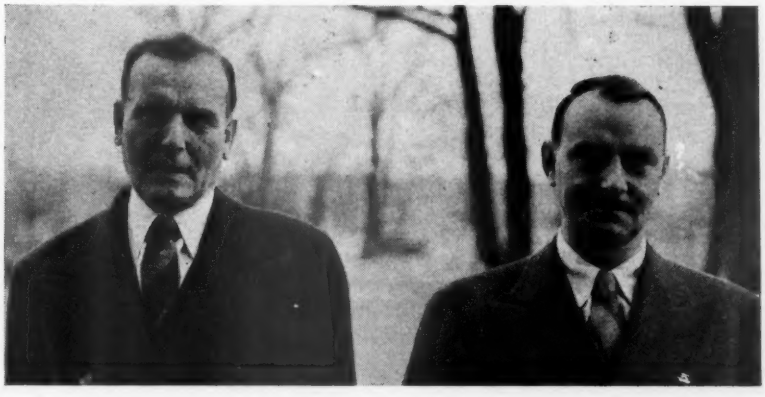
37. **Stonite Roll on First Suction Press Roll**

We have been running a 40 plastometer rubber-covered roll, crowned 185/1000 inch, as top roll on a brass suction press roll crowned at 30/1000 inch, and have been having trouble with the roll picking on newsprint furnish. The top roll is 28" diameter, 238" face, and weighs 16,500 lbs. Will a Stonite roll, weighing 20,500 lbs., tend to eliminate this picking, and, if so, what crown would be recommended.

38. **Sheet Sticks to Wire**

In running light weight tissues on a Harper machine at 600 feet per minute, the sheet tends to stick to the wire and is not picked up by the felt. Increasing the weight (basis weight) or freeing-up the stock will help eliminate the sticking, but by doing this the characteristics necessary to meet the paper specifications are destroyed. The top couch roll is set off center 15" and is rubber covered of 100 plastometer with ¼" ball. What can be done to eliminate this sticking.

39. Discussion of the optimum vacuum to carry on suction couch and press on News machines.



THE ONKELS BROTHERS attended the Superintendents' Meeting in Longview, December 6th and 7th . . . On the left, RAY C. ONKELS, Superintendent, Westminster Paper Company, New Westminster, B. C.; and on the right, PETE J. ONKELS, Superintendent, Pacific Coast Paper Mills, Bellingham, Washington.

Waxing

40. Discuss the type of felt to use on waxing and coated papers to eliminate lairs on finished sheet.
41. What is the optimum wire mesh to use in making 10 pound Sulphite Waxing.

Cylinder Board Machines

42. What kind of equipment is best suited for cleaning stack dryers in a cylinder board machine.
43. What is the best method of binding the ends of a cylinder wire onto the wire.
44. What kind of inlet is best suited to get even distribution in a cylinder vat.
45. How can raveling at edges of cylinder machine bottom felts be prevented.
46. Will a cylinder board machine run safely with top and bottom felt leaving sheet after first press.
47. Discuss effect of cylinder mold design, with particular reference to width and number of spokes on formation at speeds in excess of 350 feet per minute.

Ladies Entertainment

● Saturday afternoon, while the men were attending the Round Table Discussion, the ladies played bridge. The door prizes were won by Mrs. C. E. Ackley, Mrs. Chauncey Baxter, Mrs. Herman Hoehne, Mrs. C. E. Wheeler and Mrs. A. S. Viger. The draw prizes went to Mrs. William C. Marshall, first; Mrs. Walter E. Hodges, second; and Mrs. H. R. Heuer, third.

The bridge party was arranged by the ladies committee, Mrs. Carl Fahlstrom, chairman; Hrs. George H. McGregor and Mrs. Preston Varney.

The Banquet

● After the reception Saturday evening, held in honor of the new officers, the large crowd sat down to the banquet. The toastmaster was A. S. Quinn, secretary-treasurer of the Pacific Coast Division.

Mr. Quinn introduced the new officers and asked the newly elected chairman, Niles M. Anderson, to speak. Mr. Anderson thanked in behalf of the organization those who had contributed their time and efforts toward planning the meeting, Zana Wise, E. A. Des Marais, A. H. Hooker, Mrs. Carl Fahlstrom, Mrs. George H. McGregor, Mrs. Preston Varney, Tony Siebers and A. S. Quinn.

Tom Beaune, pulp mill superintendent for Fibreboard Products Inc., at Port Angeles, was introduced as the oldest superintendent in point of service on the Pacific Coast.

Mr. Quinn announced that the officers had ordered flowers to be sent to Tony Siebers who was in the hospital suffering from influenza and the flowers would be accompanied by an expression of esteem and hope for his speedy recovery signed by all present at the banquet. Over a hundred men and women present signed the scroll.

Following the banquet the evening was devoted to dancing.

Registration

● The list of those who registered for the Longview meeting of the Pacific Coast Division of the American Pulp & Paper Mill Superintendents' Association, December 6th and 7th, 1940, follows:

● **Mr. and Mrs. C. E. Ackley,** Hawley Pulp & Paper Co., Oregon City; **Fred Alsop,** Van Waters & Rogers, Portland; **Leslie L. Anderson,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Mr. and Mrs. Niles M. Anderson,** St. Regis Paper Co., Kraft Pulp Division, Tacoma; **Mr. and Mrs. Fred Armbruster,** Great Western Division, The Dow Chemical Co., Seattle; **G. J. Armbruster,** Soundview Pulp Co., Everett; **Mr. and Mrs. Chauncey B. Baxter,** Tacoma Plumbing Supply Co., Tacoma.

T. H. Beaune, Fibreboard Products, Inc., Port Angeles; **C. H. Belvin, Jr.,** Chromium Corp. of America, Portland; **Louis H. Blackerby,** Pacific Pulp & Paper Industry, Portland; **Martin Breuer,** E. I. du Pont de Nemours & Co., San Francisco; **John M. Carlson,** Soundview

NEW OFFICERS of the PACIFIC COAST DIVISION of the AMERICAN PULP & PAPER MILL SUPERINTENDENTS ASSOCIATION ' ' ' Seated, left to right, MERRILL E. NORWOOD, First Vice Chairman; NILES M. ANDERSON, Chairman; GEORGE H. McGREGOR, Second Vice Chairman ' ' ' Standing, left to right, H. A. DES MARAIS, member of the Finance Committee and past Secretary-Treasurer; A. S. QUINN, Secretary-Treasurer; NORMAN LEWTHWAITE, member of the Finance Committee.

Pulp Co., Everett; **N. W. Coster,** Soundview Pulp Co., Everett; **A. M. Cadigan,** St. Regis Paper Co., Kraft Pulp Division, Tacoma; **J. V. B. Cox,** Paper Makers Chemical Division, Hercules Powder Co., Portland; **James A. Cunningham,** Simond Saw & Steel Co., Tacoma; **H. A. Des Marais,** General Dyestuff Corp., San Francisco.

R. E. Drane, St. Helens Pulp & Paper Co., St. Helens, Ore.; **Mr. and Mrs. E. G. Drew,** Drew & Hoffman, Portland; **Alan Dunham,** Lockport Felt Co., Portland; **Mr. and Mrs. Carl Fahlstrom,** Longview Fibre Co., Longview; **John M. Fulton,** Pacific Coast Supply Co., Portland; **B. R. Gardner,** Pennsylvania Salt Mfg. Co. of Washington, Tacoma; **Howard B. Gerber,** Williams Gray Co., Chicago; **William R. Gibson,** Northwest Filter Co., Seattle.

George Gladding, Soundview Pulp Co., Everett; **T. H. Grant,** Columbia River Paper Mills, Vancouver, Wash.; **George G. Guild,** Huntington Rubber Mills, Seattle; **H. W. Hall,** The Dicalite Co., Seattle; **Mr. and Mrs. H. A. Hauff,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Mr. and Mrs. H. R. Heuer,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Mr. and Mrs. W. H. Hodges,** Appleton Wire Works, Portland; **Mr. and Mrs. H. F. Hoehne,** Longview Fibre Co., Longview; **J. G. Hoffman, Jr.,** Drew & Hoffman, Portland.

Mr. and Mrs. George A. Holt, Rayonier Incorporated, Hoquiam; **A. H. Hooker, Jr.,** Hooker Electrochemical Co., Tacoma; **Jack Johnson,** Appleton Woolen Mills, Portland; **Joe G. Jenkins,** Hawley Pulp & Paper Co., Oregon City; **Miss Edythe Johnson,** Soundview Pulp Co., Everett; **W. A. Kelly,** The Waterbury Felt Co., Portland; **Mr. and Mrs. Wm. N. Kelly,** Pulp Division, Weyerhaeuser Timber Co., Longview; **T. J. Kennedy,** Pacific Straw, Paper & Board Co., Longview; **Foss B. Lewis,** Simonds Saw & Steel Co., Portland.

Norman Lewthwaite, Crown Zellerbach Corp., Port Townsend; **Mr. and Mrs. Wm. C. Marshall,** Heller & Merz, Portland; **H. N. Miller,** Westinghouse Electric & Mfg. Co., Portland; **Mr. and Mrs. C. J. McAllister,** Simonds Worden White Co., Portland; **Mr. and Mrs. G. H. McGregor,** Pulp Division, Weyerhaeuser Timber Co., Longview; **C. L. McPhail,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Joe E. McQuaid,** Griffith Rubber Mills, Portland; **C. W. Morden,** Morden Machines Co., Portland; **Merle Norwood,** Columbia River Paper Mills, Vancouver, Wash.

Max R. Oberdorfer, St. Helens Pulp & Paper Co., St. Helens; **F. A. Olmsted,** Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; **P. J. Onkels,** Pacific Coast Paper Mills, Bellingham; **Mr. and Mrs. R. C. Onkels,** Westminster Paper Co., New Westminster, B. C.; **H. Parr,** Pacific Straw Paper & Board Co., Longview; **Morris Peterson,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Mr. and Mrs. R. T. Petrie,** Black-Clawson & Associated Companies, Portland; **William Pirie,** Powell River Co., Powell River, B. C.; **Mr. and Mrs. George Quigg,** Fir-Tex Insulating Board Co., St. Helens.

Mr. and Mrs. J. H. Quigley, National Paper Products Co., Port Townsend; **A. S. Quinn,** Stebbins Engineering Corp., Seattle; **E. D. Rich,** Oregon Pulp & Paper Co., Salem; **H. H. Richmond,** Electric Steel Foundry Co., Portland; **Jim Ruck,** St. Regis Paper Co., Kraft Pulp Division, Tacoma; **Mr. and Mrs. Walter A. Salmonson,** Simonds Worden White Co., Seattle; **Barton W. Sawyer,** Northwest Filter Co., Portland; **Harlan Scott,** Pacific Pulp & Paper Industry, Seattle.

Fred Shaneman, Pennsylvania Salt Mfg. Co. of Washington, Tacoma; **Brian Shira,** Pennsylvania Salt Mfg. Co. of Washington, Tacoma; **D. L. Shirley,** Link-Belt Co., Portland; **Mr. and Mrs. Carl Sholdebrand,** Hawley Pulp & Paper Co., Oregon City; **Joseph Shrawder, Jr.,** Krebs Pigment & Color Corp., Los Angeles; **Mr. and Mrs. A. P. Siebers,** Longview Fibre Co., Longview; **C. V. Smith,** St. Helens Pulp & Paper Co., St. Helens; **J. F. Smith,** Great Western Division, The Dow Chemical Co., San Francisco; **Lawrence K. Smith,** Pacific Pulp & Paper Industry, Seattle.

Ray Smythe, Rice, Barton & Fales, Inc., Portland; **E. E. Stephens,** Bumstead-Woolford Co., Seattle; **Earl G. Thompson,** Great Western Division, The Dow Chemical Co., Seattle; **Ed. Tidland,** Pacific Coast Supply Co., Portland; **Mr. and Mrs. Preston Varney,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Mr. and Mrs. A. S. Viger,** Rayonier Incorporated, Shelton; **R. O. Vognild,** Hooker Electrochemical Co., Tacoma; **Mr. and Mrs. T. J. Waltmon,** The Ohio Knife Co., Portland; **J. B. Ward,** Hooker Electrochemical Co., Tacoma; **L. H. Wear,** Taylor Instrument Companies, Portland.

Mr. and Mrs. R. S. Wertheimer, Longview Fibre Co., Longview; **Jack Wilcox,** Electric Steel Foundry Co., Portland; **Mr. and Mrs. John Wilcox,** Longview Fibre Co., Longview; **James A. Wilson,** Hawley Pulp & Paper Co., Oregon City; **Zana A. Wise,** Griffith Rubber Mills, Portland; **Arthur Zimmerman,** Pacific Straw Paper & Board Co., Longview.

Awards Made for Suggestions at Camas

● At the sub-foremen's meeting of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, Camas, Washington, on November 28, ten paper mill employes were presented with a total of $185. The awards were for suggestions the men had made which resulted in savings in the sulphate mill.

The largest payment was a posthumous award of $50 to the late F. W. Hudson. The money was presented to Mrs. Hudson. Art Williams, J. J. Aube and A. C. Smith received $20 each. Other recipients were Clarence Esser, A. G. Natwick, L. Ross, D. N. Johnson, M. E. Derby and R. L. Warren, who received $12.50 each.

J. E. Hanny, resident manager, made the awards to the men in recognition of their useful ideas and suggestions.

Framptons Vacation

● Charles Frampton, superintendent of the Fernstrom Paper Mills, Inc., at Pomona, Calif., enjoyed a week's vacation early in November at Laguna Beach. Mrs. Frampton accompanied him. The weather was the sort the All Year Club describes in its advertisements about Southern California, Mr. Frampton reported, and as a result they had a pleasant holiday and a good rest.

Death Takes W. C. Barnes

● W. C. Barnes of the Crown Willamette Paper Company, Division of the Crown Zellerbach Corporation, Camas, Washington, died in the Clark general hospital at Vancouver, November 29th. He was a specialist in precision machine work and had been in the employ of the company at Camas over 21 years since he started in August, 1919.

Barnes worked through the day of November 27th at the mill and was taken to the hospital November 28th after acute infection had set in. This was diagnosed as peritonitis.

Shipments Lag on Swedish-German Pulp Deal

● Shipments of pulp to Germany under the contract concluded last summer are still slow. The previously large fleet of German ships in the Baltic has been almost completely withdrawn, and freights offered by German buyers for wood pulp cargoes have not proved acceptable to Swedish ships. It is now reported, however, that the Germans are apparently making energetic efforts to have all the pulp bought under the contract shipped before the end of the current shipping season, reports the Assistant U. S. Trade Commissioner in Stockholm.

Bellingham Girl Takes Initiative in Charity Work

● "Little Red Riding Hood up-to-date is Dorothy Jones, pretty young labeler at the Pacific Coast Paper Mills," comments the Bellingham Morning Herald, "but she doesn't tote a Thanksgiving basket full of goodies to her grandmother. In fact, she totes far more than one, has for the past four years, and sees that they go where they do the most good.

"Before every Thanksgiving Dorothy hangs up a notice at the plant calling for donations, and employes contribute food and money. The money is used to buy what food is needed in addition to the contributions. The employees always know of enough needy families to exhaust the supply. A friend drives his car and the welcome Thanksgiving baskets of good cheer are distributed.

"Dorothy is loath to talk about her work and when forced to she always uses the plural, "we," the "we" meaning herself and fellow workers. But the boys at the plant give her all the credit. It was her idea. They just supply the ammunition.

"How did she start it? She says, "I just thought it was a good idea. We're working steadily, more fortunate than a lot of others."

Pulp Prices Hold For First Quarter

demeption call has been published. Un-

● Wood pulp prices are to remain the same for the first quarter of 1941 as they were in the third and fourth quarters of 1940.

Late in November and early in December the major American and Canadian producers of pulp for the market announced individually that there would be no change in prices for the first quarter.

This means that the price of bleached sulphite will continue at $72.50 ex dock Atlantic ports; unbleached sulphite at $63.50 ex dock; and, bleached kraft at $82.50 ex dock Atlantic ports.

Bleached soda pulp remained at $66.00 per short ton delivered at consuming centers.

Prior to the announcements there was considerable agitation on the part of buying mills for a reduction in pulp prices on the basis that paper prices had not risen to levels commensurate with pulp prices. On the other side the pulp mills as a group felt that no reduction was in order in view of the rise in certain costs that they have absorbed and with further increases in costs, particularly taxes, a certainty that must be taken into consideration.

The holding of pulp prices at their present levels should have a stabilizing influence on paper prices during the first quarter for the paper manufacturers now know definitely the cost of their basic raw material and can go to work to reduce costs and raise prices on certain grades if necessary to put them over onto the profit side.

Rayon grades of bleached sulphite also remain at the previous level, the base price being $75 per ton of 2,000 pounds, air dry weight, ex dock Atlantic ports. The rayon or dissolving grades range in price from $75 to $100 per ton.

Kraft Liner Price Stands

● Although demand for container board currently is running at such a high rate that many mills are operating seven days a week, a leading producer of kraft liner board has announced retention of the present price of $55 a ton for that board through to the end of the first quarter of 1941, it was reported.

This action will mean that the present price will have been in effect for 15 months by March 31, despite the virtual disappearance since late Spring of the considerable quantity of Scandinavian pulp formerly used by the paper industry in the United States.

Kraft liner board which is used in manufacturing shipping containers, was advanced to $55 a ton at the start of 1940, and the same price was kept for the second quarter this year. After the invasion of Norway, with the threat of ending of pulp imports into the United States from Scandinavia, it appeared possible that some further price advance would be necessary.

However, at the end of May, producers announced that the price would not be changed for July, but because of the possibility of sudden changes in the picture, restricted their price announcement for one month against the three months policy previously followed.

Hawley Retires All First Mortgage Bonds

● The Hawley Pulp & Paper Company notified bondholders on November 25th that it will retire on January 1st its $649,000 outstanding 6 per cent first mortgage sinking fund bonds.

Redemption price will be 102½, plus coupons for the interest due July 1, 1933, and January 1, 1934. Those coupon payments had been held up by reorganization in 1934, for payment at maturity of the issue previously fixed as July 1, 1946.

● In its issue of November 20, 1940, the "Oregon Voter" analyzed the Hawley Pulp & Paper Company's financial situation, showing clearly the progress that has been made under the present management. We quote in full.

"Hawley Pulp & Paper Co., rounding out a year even more satisfactory than anticipated, will wipe out all bonds on Jan. 1, 1941. Annual report of last February set the retirement of all remaining 6 per cent bonds as a goal for this year, provided earnings held up well; now the bond redemption call has been issued. There is said to be $399,000 of the bonds outstanding.

"The company also is expected to pay off $250,000 due on its note, created at reorganization time in 1934. Unofficially, this is said to be total due on the note, original face of which was $500,000 and principal amount of which was $348,113 at end of 1939. It was issued to the bond underwriting firm and from it was purchased by Western Cooperage Co., which has held the management contract for Hawley since the reorganization.

"Total face of bonds and note to be paid from cash on hand, as noted, amounts to $649,000 or thereabouts. It is stated that the company does not borrow a dollar in order to make the payments. This condition was presaged in the last annual report, when "available funds" in control of the directors were $423,422; deposits with the trustee were $137,599 and cash in bank accounts was $163,568—a total of $724,590.

"Due to premium and regular and accrued interest, the company of course will pay out much more than mere principal of 399 bonds of $1,000 each. Coupons for one year's interest—for 1933—have been a deferred obligation. Premium on the bonds, under indenture provisions, is to be 2½ per cent, or $25 per $1,000 bond. Thus the holder is to receive $1,115 for each bond surrendered, as follows:

Bond principal	$1,000
Old interest, 1933	60
Current interest, ½ year	30
Redemption premium	25
Total	$1,115

"Until Jan. 1, the call price for the bonds is 105. It is no longer possible literally to take advantage of the 2½ points higher call price, since the reder special offer of the company voluntary surrenders of the bonds during most of 1940 brought the holder $1,110. Holders need not now wait until Jan. 1 to cash their bonds but may receive full payment upon surrender of the bonds to the Bank of California, or to Continental Illinois National Bank and Trust Co. of Chicago. At end of 1939, the report showed $649,000 of the bonds outstanding but this amount has been cut down rapidly through voluntary tenders under the offer made by the company. Maturity date is July 1, 1946. Total originally issued in 1926 was $2,900,000.

"If Hawley pays off the note as well as the bonds as expected, holders of the stocks may begin expecting something on dividends before long. At the end of 1940 the accumulations of unpaid dividends on $7 preferred will be $35, or for years 1939 and 1940, plus accruals which were due Jan. 1, 1934, and were placed in stand-by status thereafter. There will be two years' accruals on the $6 second preferred, or $12. There are 20,000 shares of the first preferred and 8,000 shares of the second preferred. Accumulated undeclared dividends thus will total $700,000 and $96,000, respectively, adding to a grand total of $796,000. First preferred stock is redeemable.

"In 1939 Hawley had $236,431 net income and is expected at least to double that figure in 1940."

Howard Graham Serving Year in Army

● Howard C. Graham, formerly technical supervisor at the Washington Pulp & Paper Corporation, Division of Crown Zellerbach Corporation, Port Angeles, now is serving as a first lieutenant in the U. S. Army Ordnance Corps, at Picatinny Arsenal, Dover, New Jersey. Graham, a reserve officer, was called to active duty in mid-November, for a year's service. In his work for Crown Zellerbach he divided his time between the Port Angeles plant and the technical laboratories at Camas and at other units of the company.

Chemical Derivatives of Lignin

Nitrolignin

by J. S. CARPENTER* and H. K. BENSON**

Abstract

Nitrate derivatives of sulfite waste liquor, butanol lignin and hemlock lignin were prepared and analyzed. The nitrogen content was practically constant at 4.0 per cent, indicating similarity, insofar as the degree of nitration was concerned. Sulfite waste liquor and calcium lignosulfonate were not easily nitrated but recated well after desulfonated by sodium hydroxide.

THE availability of the total solids of sulfite waste liquor in thousand ton lots, as the result of commercial enterprise, enhances the interest in the chemical possibilities of its chief constituent, lignin. This investigation was undertaken to ascertain first the procedure necessary to make the lignin in the total solids of sulfite waste liquor readily reactive for other lignin products, and second to compare it in this respect with lignin isolated from wood or still contained in wood. If a situation did arise where nitrolignin was of commercial value it would be important to know if one could produce a nitrolignin from waste liquor which was identical to that produced from isolated lignins or directly from wood. If such were the case the sulfite waste liquor would be the logical source of raw material due to its availability and low cost.

A companion investigation, the preparation of chlorolignin, was published in the August, 1940, number. The raw materials were the same, viz. (1) isolated lignin; (2) sulfite waste liquor; and (3) hemlock wood.

Previous Work and Historical Background

● Probably the most important work which has been done on the nitration of lignin is that of Karl Kurschner[1] of Germany. Kurschner is of the opinion that the nitrolignin possesses a definite structure. To substantiate his claim, he submits analytical data and photomicrographs of nitrolignins recrystallized from butyl alcohol and ethyl acetate. Kurschner carried out his work on wood and isolated lignins, using a nitrate mixture consisting of four parts ethyl alcohol to one part of concentrated nitric acid.

The most important work which has been done in this country is that of Doree and Hall[2] who obtained a nitrolignin directly from waste liquor. The lignosulfonic acid, which is present in the waste liquor in colloidal form, was obtained by these investigators by means of dialysis in cellulose parchment bags. One part of this isolated lignosulfonic acid was then heated for four hours on a water bath with twenty parts of aqueous 5 per cent nitric acid solution. The nitrated solution was again dialyzed and evaporated, yielding a light orange non-deliquescent powder, very soluble in water, but insoluble in pure organic solvents.

Another notable method used in obtaining a nitro product of lignin is that given by Powell and Whittaker[3]. These investigators added small amounts of alkali lignin to a mixture of equal parts of concentrated nitric and sulfuric acids. The mixture was originally kept at –5° Centigrade, and later kept for one hour at 0° Centigrade. By pouring into ice water, a red powder soluble in alcohol and acetone was obtained. Johnson[4] was able to duplicate this work only with difficulty, using as the raw material an organic lignin compound salted out of waste liquor by means of sodium chloride. His product was a light yellow powder.

Raw Materials

Raylig

Raylig is the trade name given to the evaporated sulfite waste liquor from Rayonier Incorporated located at Shelton, Washington. This waste liquor is obtained from the pulping of hemlock wood.

Raylig is a dark brown granular substance, containing 4 per cent to 5 per cent moisture when air-dried. When dry it has little or no odor, but on solution in water it gives the characteristic odor of sulfite waste liquor. It is soluble in water and dilute acids, and extremely soluble in dilute bases, but insoluble in organic solvents (Table II). The residue on ignition is 18.0 per cent, and it contains 7.0 per cent calcium and 5.8 per cent total sulfur (Table I).

Calcium Lignosulfonate

The major constituent of the sulfite waste liquor is the soluble lignin compound which is commonly known as calcium lignosulfonate. However, the waste liquor also contains carbohydrates, sugars, oils and resins and $Ca(HSO_3)_2$. The calcium

Table I. Analysis Raw Materials

Material	Per cent Residue on Ignition	Per cent Calcium	Per cent Sulfur	Color
Raylig	18.0	7.0	5.8	Dark brown
Calcium lignosulfonate	19.7	8.3	4.0	Brown
Desulfonated calcium lignosulfonate	12.9	4.7	2.4	Grayish brown
Butanol lignin	3.5	0	0	Brown

(Samples air-dried and desiccated)

Table II. Solubilities of Raw Materials

Solvent	Raylig	Calcium lignosulfonate	Desulfonated Calcium lignosulfonate	Butanol lignin
Water	Soluble	Partly sol.	Insoluble	Insoluble
Ethyl Alcohol	Insoluble	Insoluble	Insoluble	Partly soluble
Benzene	Insoluble	Insoluble	Insoluble	Insoluble
Carbon tetrachloride	Insoluble	Insoluble	Insoluble	Insoluble
Acetone	Insoluble	Insoluble	Insoluble	Slightly soluble
Acetic Acid	Insoluble	Insoluble	Insoluble	Very soluble
Dilute HCl	Soluble	Partly sol.	Insoluble	Insoluble
Dilute NaOH	Very sol.	Soluble	Very sol.	Very sol.
Diethyl Ether	Insoluble	Insoluble	Insoluble	Insoluble
Ethyl Acetate	Insoluble	Insoluble	Insoluble	Partly soluble
Chloroform	Insoluble	Insoluble	Insoluble	Slightly soluble

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lignosulfonate is present in a colloidal state while the latter constituents are probably in true solution. Since all of the lignin material is present as this organic calcium salt, it seemed advantageous to make a separation of the colloid, thus removing a large quantity of the non-essential constituents of the waste liquor.

One method of removing the colloid, is by means of dialysis, as done by Doree and Hall (l.c.). Another method of separating the colloid is to precipitate it by the addition of lime, as is done in the Howard process[5].

The method used by the writers in precipitating the calcium lignosulfonate, however, was that outlined by Moore[6].

Organic colloids, such as calcium lignosulfonate are hydrophylic, that is, hydrated to a large extent. Thus organic colloids possess two stabilizing factors which tend to keep them in colloidal suspension. These two factors are the electric charge on the particle and the thin film of water surrounding each particle. Therefore in order to precipitate a hydrophylic sol it is necessary not only to remove the charge from the particle, but also to dehydrate it.

The particle can therefore be discharged by addition of an electrolyte of opposite sign, and dehydrated by the addition of a dehydrating agent (alcohol, acetone, tannin), at which point complete flocculation occurs. This was the method used in this investigation. The dissolved Raylig was allowed to stand for a few days to settle out carbon particles. Powdered lime was next added to bring the solution to a pH of approximately 10 at which the iso-electric or "lime end point" was reached. At this point the colloid possesses its minimum charge. The precipitate which gathers consists of calcium hydroxide and calcium sulfite.

The solution was allowed to stand and the calcium hydroxide and calcium sulfite settled to the bottom. The solution was filtered through a suction filter.

Now on the addition of ethyl alcohol, large quantities of tan-colored precipitate immediately separated out. A quantity of alcohol equal approximately to one-fourth of the solution volume was usually necessary. The precipitate settles and it is possible to test a small part of the clear liquid with more alcohol. When sufficient alcohol has been added, the precipitate may be very readily filtered on a suction filter, and sucked nearly dry of the filtrate.

On drying in air, the tan-colored precipitate turns a very dark brown, due no doubt to oxidation by the air. The air-dried precipitate was pulverized to a fine powder to be used for further work. The solubilities of this material were nearly identical to those of Raylig, as can be seen from Table II. The calcium lignosulfonate gave a 19.7 per cent residue on ignition, and contained 8.3 per cent calcium, and 4.0 per cent total sulfur (Table I).

Desulfonated Calcium Lingnosulfonate

● It was expected that the organic precipitate of calcium lignosulfonate would be a very suitable raw material for the preparation of nitrolignin. However, after considerable experimenting it was found that calcium lignosulfonate was unsatisfactory as a starting material.

On comparing the characteristics of the calcium lignosulfonate with the characteristics of the two other satisfactory raw materials, namely butanol lignin and wood flour, it was reasoned that the presence of either the calcium or the sulfonic groups was responsible for the difficulty in nitration.

The logical procedure to make the lignin in the calcium lignosulfonate available was therefore to attempt to make a removal of the sulfonic groups. The method used to remove sulfonic groups from organic compounds is hydrolysis.

The sulfonate radical is probably formed on the lignin molecule by opening up a ring system, forming a hydroxyl group, at which point the sulfonate radical is attached.

$$\equiv COH + HSO_3H \rightarrow C\text{-}SO_3H + H_2O$$

Thus the hydroxyl groups and the weak places of the ring structure are occupied, making nitration more difficult. On hydrolyzing the calcium lignosulfonate, the following reaction probably occurs:

$$C\text{-}SO_3H + 2\,NaOH \rightarrow \equiv COH + H_2O + Na_2SO_3$$

The classical methods of hydrolyzing organic sulfonic compounds consist of fusing the compound with a strong alkali, or heating the compound to a high temperature in the presence of a stream of superheated steam. It generally requires a treatment as drastic as these in order to break the sulfonic group loose from the molecule.

Several attempts were made to fuse small amounts of calcium lignosulfonate with caustic soda in an iron crucible, using one gram of sodium hydroxide per gram of calcium lignosulfonate. The resulting product was found to be wholly unsatisfactory for the process of nitration, and gave every appearance of being severely carbonized. It was felt that such a drastic treatment as this had no doubt broken down the large and sensitive lignin molecule.

The next attempt that was made to desulfonate the calcium lignosulfonate was much less drastic. A large amount of freshly precipitated calcium lignosulfonate was prepared from Raylig as described. The calcium lignosulfonate was filtered and sucked as dry as possible on a Buchner funnel and weighed while moist. Five hundred and thirty grams of the moist calcium lignosulfonate were available, and estimating the moisture content to be 40 per cent, this gave three hundred and eighteen grams of dry calcium lignosulfonate. The precipitate was made up to a slurry of about a liter in volume in a two liter beaker. Three hundred and twenty grams of flake sodium hydroxide was dissolved in about a half liter of water and the solution slowly added to the calcium lignosulfonate slurry, which was well stirred by means of an electric stirrer. The alkaline mixture was then heated with a small flame and stirred thoroughly for three and a half hours. The temperature range of the mixture was kept between 130°-140° Centigrade, at which temperature slight frothing of the mixture occurred.

At the end of three and a half hours the solution had concentrated down to a thick, viscous mass of about 700 ml. volume, but it was still in fluid form capable of being stirred. On allowing the mass to cool, it solidified to a jelly-like solid.

The cooled, desulfonated mass was then dissolved in about a liter and a half of water. A calculated amount (460 ml.) of glacial acetic acid was added slowly to the solution, allowing the solution to cool between additions. During the addition of the acid considerable frothing occurred, and sulfur dioxide was given off. As the solution became neutral, large amounts of tan-colored precipitate appeared. The precipitate was placed in a 6½-inch Buchner funnel and washed with cold water for eight to ten hours. At this time the wash water from the precipitate was only slightly yellow in color. The precipitate, which was a light grayish brown, be-

came more of a light chocolate brown when air-dried. It was very light and powdery, and convenient to handle, possessing no odor. A yield of 63 grams of air-dried product was obtained.

An analysis of the desulfonated product showed that it gave a 12.9 per cent ash, 4.7 per cent calcium, and 2.4 per cent total sulfur (Table I). Thus the material has had its sulfur content reduced from the 5.8 per cent of the Raylig to the 2.4 per cent of the desulfonated product.

Whether this 2.4 per cent sulfur represents certain sulfonic groups which are so firmly attached that the milder treatment did not remove them, or whether it represents absorbed calcium sulfite which was not removed by washing was not determined. However, it can be said the reduction in sulfur content, with the possible removal or loosening of the bonds of the remaining 2.4 per cent, materially changed the characteristics of the calcium lignosulfonate. The desulfonated calcium lignosulfonate was now capable of being readily nitrated, making a very suitable raw material for the production of nitrolignin.

Butanol Lignin

The isolated lignin which was used in this work was prepared by Dr. A. J. Bailey, who prepared it in a manner described in the literature[7].

The lignin from hemlock is light brown in appearance, and gives an ash of 3.5 per cent. This ash consists almost wholly of sodium chloride not thoroughly removed during dialysis. One of the advantages of the butanol lignin is the fact that it possesses very favorable physical properties. Lignins isolated by strong acids are relatively insoluble, while the butanol lignin shows marked solubilities in a number of solvents (Table II). Also, the total lignin in the hemlock wood is obtainable by this method, and not some particular fraction of the total lignin, as is so often the case.

Hemlock Wood Meal

● The third nitrolignin was prepared directly from hemlock wood flour without any preliminary isolation of the lignin content.

Nitration Experiments

● **Butanol lignin.** Butanol lignin was nitrated in a manner very similar to that suggested by Kurschner. Ten grams of butanol lignin was nitrated in a solution consisting of 100 ml. of alcohol and 25 ml. of concentrated (97 per cent) nitric acid. The solution was refluxed in a 250 ml. round bottom flask for two or three hours on a water bath. The solution was cooled, and a small amount of carbonaceous matter filtered off. The nitration solution was now poured slowly with vigorous stirring into 500 ml. of cracked ice and water. A precipitate of light yellow nitrolignin immediately separated out.

The precipitated nitrolignin was allowed to stand for a time, and the nitrolignin tended to coagulate. The mixture was then filtered through a large fluted filter in a five-inch glass funnel. The filtrate is bright yellow in color, due to the dissolved nitrolignin, since the product is appreciably soluble in water.

The filtered nitrolignin was washed by adding small amounts of ice water. This was necessary to wash out the nitrating solution of alcohol and excess nitric acid. The washing was restricted as much as possible, since it also results in the solution of part of the nitrolignin.

The filtered precipitate was air-dried, and subsequently dried in a desiccator prior to analysis. The color of the nitrolignin from butanol lignin is orange-yellow. Five to six grams of nitrolignin were obtained from ten grams of butanol lignin, which gave a 55 per cent yield based on the butanol lignin used.

Hemlock wood. Sixty grams of wood meal was added to a mixture of 500 ml. of alcohol and 125 ml. of concentrated (97 per cent) nitric acid. The mixture was refluxed for three hours in a two liter round bottom flask on a water bath. The nitration solution became reddish-orange in color.

The nitrated material was filtered through a Buchner funnel into a dry suction flask. The wood pulp was all packed into the Buchner funnel. An additional 150-200 ml. of alcohol was placed in the two liter flask and heated to boiling over the water bath. This was poured in small quantities over the wood pulp in the Buchner funnel. This served to dissolve out additional nitrolignin. The wood pulp was finally pressed firmly by means of a porcelain pestle, removing all of the nitrated solution.

The alcoholic nitration solution was now slowly added to about a liter of cracked ice and water as previously outlined. The canary yellow precipitate of nitrolignin was again filtered through a fluted filter and washed.

The air-dried precipitate was a very bright canary yellow color. Yields of 13 per cent to 14.5 per cent based on the wood were obtained. Assuming the wood to contain 25 per cent lignin, yields of nitrolignin based on lignin present are 51 per cent to 57 per cent, which is approximately the same as from butanol lignin.

Desulfonated calcium lignosulfonate. A sample of ten grams of desulfonated calcium lignosulfonate was refluxed with 100 ml. of alcohol and 25 ml. of concentrated nitric acid on a steam bath for two hours. On pouring the filtered nitration solution into 500 ml. of ice water, the usual precipitate of nitrolignin occurred. However, this precipitate is usually a yellow-orange color, considerably darker than the other nitrolignins. It is therefore necessary to coagulate the precipitate, filter, dry and re-nitrate in an alcoholic solution exactly as outlined above. The second precipitation usually resulted in the desired yellow or orange-yellow product.

The nitrolignin is filtered, air-dried, and finally dried in a desiccator. The nitrolignin from the desulfonated calcium lignosulfonate was orange-yellow in appearance, and almost identical to that obtained from butanol lignin.

Chemical and Physical Properties

● The chemical analysis of the three nitrolignins is given in Table III. It is noted that the color of the nitrolignins from Raylig and butanol lignin is slightly darker than that obtained from hemlock wood. The former have been subjected to digestion temperatures of 130°-160° C. This temperature history may explain the color difference.

The nitrolignins were always in the form of light, fluffy powders. The materials are non-deliquescent. On occasions the powders would dry in small clumps, but at no time did they exhibit any crystalline tendencies. That the nitrolignins showed no crystalline tendencies is to be expected considering the fact that lignin is a molecule of high molecular weight.

The fact that a crystalline structure is not indicated is also borne out by the fact that the nitrolignins had no melting points. An attempt was made to determine the melting points by suspending the material enclosed in capillary tubes in a bath of sulfuric acid, and raising the temperature of the bath slowly. The nitrolignins gradually took on a brown appearance and showed no

tendency to melt up to 250° C. On examining the material, it was found to be quite thoroughly carbonized.

When the nitrolignins are heated in an open crucible, such as in the determination of the residue on ignition, they decompose quite readily. When even a very small flame is applied to the crucible, the nitrolignin soon chars slightly around the edges and then suddenly gives off large volumes of yellow-white smoke and bursts into flame. A very aromatic odor is noticed.

The chemical analysis of the three nitrolignins are given in the following table (Table III).

The nitrolignins gave no residue on ignition, with the possible exception of the nitrolignin derived from Raylig. On occasions this material gave a residue between 0.1 per cent and 0.2 per cent.

The most interesting point, and the one most likely to point to similarity or dissimilarity between the nitrolignins was the nitrogen content. The nitrogen content was determined by means of standard Kjeldahl determinations. The check determinations in all cases were very good. They showed that the nitrogen content of the nitrolignin from Raylig and butanol lignin was identical (3.95 per cent and 3.94 per cent), while that from hemlock wood was slightly higher (4.02 per cent). These determinations were made on air-dried, desiccated materials. The slightly higher nitrogen content of the nitroproduct from wood is consistent with its slightly different color, and small solubility differences (Table IV). However, these determinations give a very valid reason for stating that the three nitrolignins are identical. The nitrogen content was also calculated to give NO_2 content (Table III).

Conclusions

1. The nitrolignins prepared from sulfite waste liquor, butanol lignin, and hemlock wood are identical in view of the analyses made.

2. The nitrogen content of air-dried, desiccated nitrolignins is 3.95 per cent-4.02 per cent.

3. Slight deviations in appearance and solubility of nitrolignin derived from hemlock wood as compared to nitrolignins from Raylig and butanol lignin are probably due to the temperature history of the three lignins.

4. Raylig and calcium lignosulfonate precipitated from Raylig are not directly suitable as raw materials for the preparation of nitrolignin.

5. Calcium lignosulfonate may be largely desulfonated by treatment with sodium hydroxide in aqueous solution in such a manner as not to drastically alter its appearance and characteristics.

6. Desulfonated calcium lignosulfonate is a very suitable raw material for the preparation of nitrolignin.

[1]Kurschner, Karl. Cellulose Chemie 12: 281-6 (1931); Zellstoff Faser 32: 87-93 (1935).

[2]Doree, Charles and Hall, Leslie. J. Soc. Chem. Ind. 43: 257T (August, 1934).

[3]Powell and Whittaker. J. Chem. Soc. 125: 357-64 (1924).

[4]Johnson, Lester L. Master's Thesis, University of Minnesota (1927).

[5]Howard, Guy C. Ind. Eng. Chem. 26:614-17 (1934).

[6]Moore, P. F. Chem. Eng. Thesis Univ. of Wash. (1936).

[7]Bailey, A. J. Paper Trade J. 110: 29-32 (Jan. 11, 1940).

Table III. Analysis of Nitrolignins

Material	Per cent N	Per cent NO_2	Per cent Ash	Per cent Ca	Per cent S	Color
Nitrolignin (Raylig)	3.95	13.00	negligible	0	0.5	orange yellow
Nitrolignin (Butanol lignin)	3.94	12.95	0	0	0	orange yellow
Nitrolignin (Hemlock wood)	4.02	13.20	0	0	0	canary yellow

(Samples air-dried and desiccated)

Table IV. Solubilities of Nitrolignins

Solvent	Nitrolignin (Raylig)	Nitrolignin (Butanol lignin)	Nitrolignin (Hemlock wood)
Water	slightly soluble	slightly soluble	slightly soluble
Ethyl alcohol	very soluble	very soluble	soluble
Benzene	very slightly sol.	very slightly sol.	very slightly sol.
Carbon tetrachloride	insoluble	insoluble	insoluble
Acetone	very soluble	very soluble	very soluble
Acetic acid	very soluble	very soluble	soluble
Dilute HCl	very slightly sol.	very slightly sol.	very slightly sol.
Dilute NaOH	very soluble	very soluble	very soluble
Diethyl ether	very slightly sol.	very slightly sol.	very slightly sol.
Ethyl acetate	very soluble	very soluble	soluble
Chloroform	slightly soluble	slightly soluble	slightly soluble

Gigler to Move to San Francisco

● Robert Gigler of the converting plant office of Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas, Wn., is to be transferred to the San Francisco office in the general accounting department within the next couple of months. He has been relieved of his usual duties by Roy Keller of the time office.

Laughton Moved to Billing Department

● R. E. Laughton of the accounting department of the Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas, Wn., has been transferred to supervise the billing department.

Filter Papers Available From Domestic Mills

● United States chemists were assured by the National Bureau of Standards, Department of Commerce, today that interruption in supply of high-grade analytical filter paper, heretofore imported from Europe, is unlikely.

According to information received by the Bureau, while interruption of supply has occurred to some extent, much foreign paper is still being received. In addition, manufacture of the higher grades has been undertaken in the United States.

Shipments of the English Whatman papers to this country since the beginning of the war have been approximately twice normal and are now running about three times normal.

The supply of Swedish Munktell papers is somewhat depleted but regular shipments are expected in the near future.

The Baker and Adamson paper is made in the United States from stock purchased in Sweden. It is of the same grade as the highest grade of foreign paper. No information has been received as to the continuance of supply.

The supply of German Carl Schleicher and Schull paper is much depleted but all of the various grades of it are now being made in the United States by the American firm of the same name from stock made in American paper mills. The Bureau finds that an examination of these papers reveals that they compared favorably with the German product. The Bureau made thorough tests of the highest grade, the double acid-washed papers, and the papers were found to be as good and in some respects better than the German papers.

While the various kinds of the American papers bear the same designation as the German papers, the American concern stated that they had no connection with the German firm.

The Eaton-Dikeman Co., a domestic manufacturer of filter papers made from paper stock also produced by them, have made the lower grades of analytical papers for a number of years. They have now expanded their grades up to single acid-washed papers. Examination of these papers by the Bureau indicated that they also compare favorably with the foreign papers. The company states they have the development of double acid-washed papers under way, and that they expect to be able to supply in the near future papers equal to all grades of foreign papers.

Chipper Knives and Chipper Knife Grinding

by NELS G. JOHNSON*

WITH one or two possible exceptions, chipper knives are subjected to more sustained "punishment" than any other knife. Most of us, however, are so much more interested in the production from a tool than the tool itself that chipper knives, their care, grinding, etc., are very largely taken for granted. It is with the thought of reminding us all of some of the inherent qualities of chipper knives and their use that this paper is presented. A better way to do things is always possible when the manufacturer and the user meet, and discuss common problems.

As you know, chipper knives, generally speaking, are of three classes —laid carbon steel, solid carbon and solid alloy—the latter being the "high production" type which has come in for considerable consideration in recent months.

When laid or solid carbon steel knives are new, that is, when they leave the factory, they are of maximum hardness for the particular mill intended. Of course, we all know that conditions in pulp mills vary—conditions in mills in one section of the country are different from another. Where a 60 Rockwell chipper knife will work satisfactorily one place, it's too hard for use in another mill. Fundamentally, however, overheating of chipper knives, regardless of original hardness, is detrimental to edge retention.

Let us assume that the carbon steel knives of which we speak are hardened to 60 Rockwell C Scale. Before these knives are ready for their finish grinding operation, they are drawn by being placed in a drawing furnace at about 450°F. for the purpose of removing all strain, "setting" the grain, and otherwise adding the essential property of "toughness" to the knife. Occasionally it is necessary to go slightly above or below 450°, depending upon the particular requirement of the individual customer. Going considerably above 450° however, the hardness drops as the heat increases and the length of time subjected to that heat, so that while a knife becomes tougher with increased heat, it loses its hardness, becomes dull quicker with consequent need for more frequent grindings.

Overheating Ruins Temper

Now, suppose these knives are put in your chippers and kept running beyond the time that the knives should be changed, that is, when the logs start "kicking back"—this condition will produce a heat beyond the original 450° drawing temperature. In spite of the fact that this condition may exist for only a short period, it will tend to soften the temper, making it necessary to grind the knives more often with a consequent loss in production. A filing and Rockwell test of knives so used reveals that the hardness generally is below what it should be for most efficient results.

Some mills use water as a coolant while chipping and such method of keeping knives cool is fine, providing the water supply is generous and is directed so as to keep the entire knife cool as it cuts. If the water supply is insufficient, its contact with knives already heated can very easily cause knives to crack, ultimately break out or "check."

Now, there are many contributing factors in this battle of steel against heat:

1. Dull Knives
2. Dull Anvil Knives or Throat Plates
3. Improper setting of Anvil Knives against Disc
4. Blunt Bevels
5. Lack of Secondary Bevels
6. Disc Speed

Since most chipper knife discs now in use hold the knives in such a way that practically the entire face of the knife comes in contact with the wood—such broad contact generates considerable heat and tends to draw their temper. Some mills have found that a slightly concave knife face or clearnace-ground knife relieves that condition.

A recent development in the chipper field particularly in the East and South is the multiple knife chipper, using 8, 10 or 12 knives. The added knives make for faster, cooler cutting and being mounted through the disc face so that only the cutting edges come in contact with the wood, the knives do not become hot enough to draw the temper.

Bed knives are sometimes overlooked owing to their being so "hard to get at" and practically impossible to see when in the machine. Some mills "hard-face" or Stellite their bed knives which is of great assistance in keeping them sharp, however, it is important to put this Stellite, or facing, on smoothly and free of blow holes. Improper grinding of these Stellite faced anvil knives will cause them to chip and spall, bringing about a worse condition than if they weren't "hard-faced" at all.

By improper setting of anvil knives with reference to the chipper disc, we mean that at times the distance between the bed knife and the cutting edge of the disc knives is too great, causing a wedging action between the wood, the anvil knife and disc knives, thereby causing undue strain, rounding of the anvil knife and excessive generation of heat.

Proper Bevel

● The subject of proper bevels is one which I should like to start and then immediately leave for Dayton —since hardly two men ever agree on which bevel is "proper," which gives best results, etc. The bevel should always be as great as possible without sacrificing necessary support for the cutting edge. Softer or greener woods can be cut to good advantage with sharp bevels—shorter bevels are necessary on dry, hard or frozen woods.

Cutting bevels have considerable to do with keeping knives cool and experimenting to find the bevel which works out best on your wood and under your mill conditions is worth while.

Secondary bevels are also the subject of much difference in opinion. Theoretically, the second bevel should make it possible to use a greater or keener cutting edge bevel by lending generous support to the knife where needed. It should also provide chip clearance, making it possible to get the chips away faster —all of this, of course, makes for better chips and less sawdust.

Disc speed is important for it determines the productivity of each

*Presented at the Fall Meeting of TAPPI in Seattle, Washington, August 20-23, 1940. Assistant General Sales Manager, Simonds Worden White Company, Dayton, Ohio.

chipper and where direct shaft motors are left at factory speeds or where belts are used that have no slippage, speed shouldn't be much of a problem, however, a slow dragging speed will generate as much excessive heat or more than a disc operating overspeed.

High Production Knives

Let us make comparison now of the recently developed high production type of knife with which you are all familiar.

These knives have inherent qualities which enable them, under favorable operating conditions, to retain their cutting edges infinitely longer than standard knives.

These knives, while twice as expensive as standard knives, are well worth the difference in price, provided operating conditions are satisfactory. Mills which have given these knives a fair test, report from three to ten times more service between grinds.

Generated heat of 450° starts to draw the temper in standard knives but the higher alloy type retain their original hardness way above 600° and for this reason, are less affected by frictional heat.

This means that they retain their edges longer, which, of course, means more production, less down time, grinding, etc. But, it is rare indeed when infinitely greater results are made possible without certain sacrifices being made by the one benefited, such as care, caution and patience.

The steel in the high production type of knife is of a very dense structure. For this reason, overheating leaves very little room for grain expansion and the consequence is, the starting of small checks—checks which might not be perceptible to the naked eye; yet—checks which will enlarge with subsequent temperature changes until finally a piece of the cutting edge breaks out. We have stated before that the temper of these knives is not affected by temperatures from 450° to 600° F., consequently, while in use, these knives remain sharp much longer, but being of a more dense structure, they are not, generally speaking, as "tough"; they are affected more by sudden temperature changes.

The same precautions apply in setting and beveling these high production knives as the standard knives. Care should be taken that the chipper knife pockets are entirely flat, free from any concavity or convexity so that the knives will be well seated! Reasons for this are that in bolting these knives in the pockets, a strain is thrown into the knife as pressure is brought on by tightening the nuts and this strain is likely to start cracks. The holding bolts should be properly fitted to the holes in the knife and the cheek plate angle should conform exactly to the end angle of the knife where knives are so designed. Where shims are used, they should support the knife evenly over its entire length.

Some mills that have run the high production knife anywhere from 12 to 40 or more hours before removing for grinding have found it more profitable to change knives every 8 hours and regrind them, regardless of condition. This makes it possible to regrind quickly, remove very little stock and cut better chips with less sawdust. By better chips, we mean more uniformity which, of course, is always desirable.

To determine the comparative value of different sets of knives, arrive at cordage cutting costs—a complete record should be kept of each set, showing when installed, hours run and number of times ground, as well as amount of wood cut per hour. Breaking out of knife edges due to accidents should be taken into consideration.

Now about grinding—

Avoid Overheating in Grinding

Since overheating seems to be the arch enemy of all chipper knife performance, it naturally follows that it should be kept at a minmum in grinding. Grinding, the dictionary says, is to be chafed, polished or sharpened by rubbing—chafe, it continues, is to make sore by rubbing, irritate, abrade — to try to make warm by rubbing.

Since the action of grinding does generate heat and lots of it, great care should be exercised in selecting a proper grinding wheel, and in using it under conditions which will perform the job at hand as coolly as possible. A wheel should be selected which is on the "soft" side and this is particularly true of wheels for grinding the high production knives.

By soft, we mean a wheel whose density and bond is in such proportion to amount and size of grain as to release each grain as soon as it becomes dull, thereby bringing up new sharp grains to continue the work of abrading. It is the dull grains which generate the heat, causing the steel to soften and adhere to the wheel; in other words, the dull grains are responsible for the "loading" of the wheel.

Grains should not be so large that they cause too much friction in grinding, or weaken the cutting edge by leaving excessively deep grinding scratches in it, nor should it be so fine that the bevel is "polished" generating more heat than necessary or desirable.

Wheels should be of aluminum oxide or refined aluminum oxide abrasive material of grain sizes 36 to 60. Recommended bonds are vitrified, resinoid and silicate of soda.

In addition to care in the selection of the proper wheel, it is also important to use a coolant, such as water, or a neutral grinding solution, in such quantities and directed at the proper contact spot between the wheel and the work to keep the knife bevel cool. (Neutral coolants are recommended because highly alkaline solutions attack certain grinding wheel bonds such as resinoid.) Insufficient coolant supply is really worse than none at all.

We might mention here that we are now producing an alloy knife which obviates a lot of the grinding difficulties experienced with the high production type knives, through a special heat treating process and which process we believe makes these knives considerably more practicable to use.

It goes without saying that since chipper knives are the "business end" of your chipper machine and "down time" is very expensive, the grinding of these knives should be entrusted only to qualified and experienced operators.

In conclusion, it is well to remember that grinding wheels cost much less than knives, and that it is good economy to invest in a few more wheels than to injure the "chip maker."

Introduce Paper Milk Bottles in Vancouver

● Milk containers are making headway in British Columbia cities, although city councils in some communities are still inclined to regard the innovation skeptically.

North Vancouver council recently gave permission to Vancouver dairies to deliver milk in paper bottles. An application is now before the Vancouver council from Richfield Farm Dairy for similar authority, and the permit has not yet been finally approved.

Vancouver's medical health officer reported to the council that he could see no objection to the use of paper containers so long as they were sterilized.

One alderman claimed that fifty bottle washers would lose their jobs if paper bottles were used. On the other hand, it was argued that production of paper bottles was a Northwest industry based on a Northwest raw material.

An Experience in Vocational Instruction

by O. T. DEFIEUX*

VOCATIONAL training is fundamentally that part of an education whereby a person earns his livelihood.

As we turn the pages of history we find that the necessity for such a training has existed from the days of primitive man. It is reasonable to presume that before the family stage of human history, man learned to fish and hunt by his own efforts, and his success was the measure of his ability to survive. Later when men began to live together, the younger persons received their training by observing and imitating the more successful hunters of the tribe. With the establishment of home life, agriculture and simple home crafts came into being, and as the necessity arose for educating the children, then the fathers at once became the first teachers of these simple crafts.

With the development of community life came the distribution of labor and those more proficient in the various arts and craft became specialists in these services. Further progress demanded that these specialists train the younger members in their respective crafts. In later centuries these specialists organized themselves into guilds and established a system of apprenticeship. This was history's first organized form of vocational training.

At the time of the founding of the American colonies the old craft guilds were no longer important in Europe, having been replaced by a newer class of merchant manufacturers operating on a much larger scale with concentrated production. With this form of industry a state controlled apprenticeship system had replaced the guild system. This new practice was adopted by the American colonies and existed through the early days of the Republic.

The tremendous industrial expansion in the United States of America during this twentieth century with the specialization of machinery and processes have further contributed to the decline of the apprenticeship system, since each industrial plant required its own peculiar specialized skills and methods of work.

These conditions have stimulated the growth of corporation training activities. Started by Hoe and Company, New York, manufacturers of printing presses in 1872, it has developed to the extent that most of larger industries today are carrying on some form of organized vocational training. In many cases the training is of a highly specialized nature and is often compulsory.

A very recent experience in vocational training for the pulp and paper industry has created considerable interest. Requests for information relative to the methods of conducting this school have been made so often that we hereby present our experience in this educational field.

Camas Paper School

● In 1933 the executives of the Camas Mill of Crown Zellerbach Corporation outlined a program of vocational training relative to the paper industry. It was thought that an opportunity should be made available for such employees who wished to extend their knowledge of the industry to do so, and that this could be better accomplished under an organized training program.

It was planned to provide a one-year training course, the opportunity for registration being unrestricted. An administrative board was established, one of the mill executives was appointed Dean and a series of 18 lectures were programmed. These lectures covered a general outline of the entire mill operations, from wood structure and preparation, through the various pulping processes, paper machine operation, paper converting, the final subjects being "Mill Organization" and "Management and Problems."

The executives, superintendents and foremen offered their services as instructors, and thus the Paper School was started. Contrary to precedent established in most such ventures the beginning was not humble. A total of 185 students registered that first year and those completing the course were insistent that they have an opportunity for advanced work, and in addition there was a large demand on the part of other employees to begin the course. Therefore it was decided to continue the school each winter adding additional courses as the demand arose. At the end of the first four years a full four-year course had become an accomplished fact.

It must be remembered that registration is unrestricted and consequently the educational qualifications of our first year students will vary from a grade school education to that of a Doctor's degree in Science or Engineering. As originally presented the first year lectures in general, required some previous technical training to allow of a reasonable appreciation by the student, and we have attributed to this cause the lowest percentage graduating class of our entire experience. The extension to a four-

REGISTRATION RECORDS

		1st Year Course	2nd Year Course	3rd Year Course	4th Year Course
1933	Enrolled	185			
	Completed	55			
1934	Enrolled	52	65		
	Completed	30	38		
1935	Enrolled	92	35	25	
	Completed	49	27	23	
1936	Enrolled	110	44	26	19
	Completed	58	27	20	14
1937	Enrolled	124	50	17	20
	Completed	67	32	14	16
1938	Enrolled	141	69	34	19
	Completed	94	55	29	18
1939	Enrolled	121	84	46	25
	Completed	91	68	33	25
Percentage completed 1939		75%	81%	72%	100%

*Presented at the 1940 Fall Meeting of TAPPI, Seattle, Washington, August 20-23rd, 1940. Steam Engineer and Plant Superintendent, Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, Camas, Washington.

year course has allowed the administration to revise the curriculum therefore to considerable advantage.

After seven years of continual operation the Camas Paper School now has an administration board comprised of:

Administrative Board

Board of Regents	4
Dean	1
Principal	1
Vice Principal	1
Registrar and Secretary	1
Assistant Registrar	1
Professors (1 each course)	4
Advisory Faculty Board	4
Mill Instructors (additional)	23
Outside Instrutcors	12
Property Men	3

The Registration Records for the seven years are given in the accompanying table.

No charges whatever are placed upon the student, complete financial support being provided by the Corporation to the extent necessitating a separate annual budget item for the Paper School. This has provided the needed facilities as meeting halls, baloptican projecting equipment, motion picture equipment, and numerous incidentals. In 1939 a well illustrated and handsomely bound text book was compiled comprising 39 chapters with a total of 519 pages of printed material. Each of these chapters deals with some special phase of the pulp and paper industry and were written by the executives, supervisors and members of the technical department of the Camas Mill. These text books are loaned to the students during the period of their training without charge. A first edition of 600 copies have been printed and an additional 500 copies are now on the press.

Each year prior to the start of the classes the Dean, the Principal, the four members of the Advisory Faculty Board and the four Professors meet to discuss desirable changes in the curriculum to increase the educational value of all of the four year courses. Statistics to date show that improvements have been made and it is the consensus of opinion of this group that continued progress must be made to maintain the desired interest.

The present schedule offers an interesting example of how a simple one-year course has developed into one of the most complete programs of optional education under corporation training activities.

The first-year course now consists of 18 1½ hour lectures including ½ hour of discussion. The first four lectures deal entirely with the fundamentals of elementary chemistry, general physics, mechanics and electricity followed by general lectures covering the history and evolution of the pulp and paper making processes and others relating to the functions of the various auxiliary departments. Laboratory equipment is used for demonstrations where possible and baloptican projecting equipment proves a boon to both student and the lecturer. Four written examinations are required and the final grading is prorated 60% on examinations and 40% for attendance.

The Second Year course is comprised of a series of sixteen lectures specializing on pulping and paper making processes as specifically carried out in the Camas Mill, complete kodachrome motion pictures have been taken of these operations in the Camas Mill, and are used in illustrating the lectures in this Second Year course. All students are required to attend a two-hour supervised visit in each of the four major departments:

(1) Wood Preparation Plants
(2) Kraft Pulping Plant
(3) Sulphite Pulping and Screening Plant
(4) Paper Mill

Three written examinations are required. Both first and second year examinations may be written at home and reference books or notes may be used.

Third Year Course

In the development of the Third Year course departures from the methods employed in the previous years have taken place. Here only four formal lectures are given and those by outside speakers. These are on subjects such as (1) conveying materials, (2) combustion, (3) metallurgy, and (4) filtration processes. The lecturers are either members of the technical staff or representatives of manufacturers in allied industries. Each student is required to spend four hours per week, a total of 64 hours, in mill study, allocated 16 hours each to wood mill, kraft mill, sulphite mill, and beater room operation, in regular progression. Four evenings are devoted to general open discussion of problems in these departments, the supervisor of the department in question taking the chair. The mill studies as required of this class are on an entirely different basis than the supervised mill visits of Second Year course. Now the students are required to follow through on the entire process from incoming raw material to the finished product. Questions may be asked of the supervisor or any operator on duty. The schedule is so arranged that the evening for general discussion of the process follows 12 hours of mill study. This allows the remaining four hours of mill study time for a re-check before the examination covering this process is to be held. All of the examinations are written in class room and the use of reference books or notes is prohibited.

Fourth Year Program

In the Fourth Year Class a similar program is followed, the lecture subjects being:

(1) Principles of Hydraulics, Pumps and Pumping
(2) Heating, Ventilating and Air Conditioning
(3) Evaporation
(4) Instrumentation

The four mill processes which form the basis for mill studies, general discussion and examinations are (1) paper machines, (2) finishing rooms, bag factory and converting plants, (3) steam, electricity, and maintenance, and (4) technical control.

At the end of each school year a graduation banquet is held and First, Second, and Third, and final Fourth Year diplomas are presented to those students who have made the necessary grades in their respective classes. Prizes are presented to the two highest honor students in each class, the prize for the two Fourth Year students being a week's trip to the Pacific Northwest paper mills at the company's expense.

A complete card index covering attendance, grades, etc., is maintained on all students who register for the Paper School, this information being available for the mill manager, personnel department and supervisors.

Evaluating Results

In evaluating the results after seven years of experience, we ask primarily what has it done for the student. Without doubt he is a more intelligent person and this additional intelligence is applicable to the vocation he now follows and which he may follow for many years to come. The mill study phase of the training is an exceptional opportunity to develop his powers of observation. He is possessed of a greater self confidence which allows him to perform his duties in a more intelligent manner. He is more able

to realize the importance of his own personal job, and that of his department, in the continuity of mill operations.

Many of the graduates have received promotion, some of which could be directly contributed to this opportunity for vocational training. Others undoubtedly would have received promotion irrespective of this training. It has provided a common meeting ground between student employees and the Mill Executives and Supervisors which otherwise would not exist. It has been an incentive to supervisors to learn how to more ably express the knowledge they have accumulated through years of education and practical experience. This factor must have an appreciable value in respect to the normal training of employees in his department in their regular duties.

There is a certain interesting reaction to this paper school by non-student employees which has been brought to light by the mill visits of the Third and Fourth year classes. The students often times ask questions of the operators which they are not qualified to answer. The embarrassment thus caused has resulted in the only reasonable defense available which is the operator, in order to maintain his self respect goes out and finds the right answers. Occasionally the result of such a situation is a new student for our next year's paper school.

This is the story of the Camas Paper School to date. It is the intention to carry on, making such modifications as becomes necessary to meet the ever changing industrial picture.

What the future of vocational training will be it is difficult to say, but it is our hope that it will always be carried out under democratic principles with equality of opportunuity and freedom for private initiative.

J. D. Zellerbach On Business Trip

● J. D. Zellerbach, president of the Crown Zellerbach Corporation, was away from his desk last month on an Eastern business trip.

Soundview Starts No. 6 Boiler

● The new boiler installed by the Soundview Pulp Company and known as No. 6, started operations early in November. It was placed in full operation immediately to permit the shutting down of other boilers one by one for changes and repairs.

The new addition to Soundview's steam generating capacity was designed by J. H. McCarthy, resident engineer for Soundview and installed under his supervision.

Plan Plant For Producing Yucca Fiber

● The General Fiber Products Corporation, recently organized in Los Angeles, is proceeding with plans for the construction of its first unit, according to an announcement by C. L. Wells, president of the company. Executive offices of the firm are at present located at 724 S. Spring Street, Los Angeles. The first production unit will be located near Kingman, Arizona, in the center of a large yucca producing area.

The plant will manufacture fiber from yucca, a desert cactus plant found throughout the southwest territory, which will be used in place of imported fibers, such as sisal, hemp, jute, etc. In manufacturing this fiber, there will be a by-product powder, which has already been found very satisfactory as in industrial cleaning agent. Work is under way to investigate the further use of this powder in the production of plastics. Other by-products are expected to be available as the operation of the plant gets under way. Herman L. Joachim, whose offices are in the Chamber of Commerce Building, Los Angeles, is consulting engineer for the company.

Schulken Paper Products Grows Steadily

● Steady expansion has been the rule with the Walter H. Schulken Paper Stock Co. of Los Angeles. A little more than two years ago the firm was launched by its president and owner, Mr. Schulken, with one small building and one baler to bale waste paper, which is sold as raw material to the several roofiing paper mills in the Southern California area. An 800-pound baler was the original piece of equipment in the plant. Shortly two more balers were added of 1200-pound capacity each.

The next phase of expansion was the addition of a newsprint excelsior manufacturing division. Following this additional space was required and further enlargement of the plant was needed for wharehousing facilities. The company operates one truck, two tractors and five trailers. Recently an export business to India and the Philippines has been developed.

Mr. Schulken makes his headquarters in San Francisco where he has been in the waste paper business for more than thirty years. In 1906 he was famous in sporting circles of the West as the Pacific Coast heavyweight boxing champion. He has organized many baseball teams since, among them several girls baseball teams, and is an expert and ardent golf fan.

Rayonier Reports Profit for Quarter

● Rayonier Incorporated reported November 25th that its consolidated net profit for the three months ending October 31st, the second quarter of its fiscal year, was $1,053,557. This was after all charges including new taxes. The profit amounts to 77 cents a share on the common stock after provision for preferred dividends.

In the preceding quarter the company netted $1,085,552, or 80 cents on the common stock, and $652,636 in the 1939 quarter, or $1.04 on the preferred, which was then in arrears.

Kenneth Chapman Chief Chemist Weyerhaeuser Everett Mill

● Kenneth O. Chapman was named chief chemist of the Everett mill, Pulp Division Weyerhaeuser Timber Company, producer of unbleached sulphite pulps, by G. S. Brazeau, manager, on December 1st.

Mr. Chapman came to the Everett mill in June of 1936 just prior to the start of operations. His first work was as a shift chemist and later as a project chemist. His start in the pulp industry was in the mill of the Puget Sound Pulp & Timber Company at Anacortes, Washington. He went to work there in October of 1934 and remained until June, 1936. Mr. Chapman is a 1931 graduate in chemical engineering from the University of Washington in Seattle.

KENNETH O. CHAPMAN, Chief Chemist, Everett Mill, Pulp Division, Weyerhaeuser Timber Company

A Letter From Dick Sandwell

● As this December number goes to press a letter arrived from P. "Dick" Sandwell, consulting engineer of Vancouver, B. C., who is now in Hobart, Tasmania, in connection with his work of designing and supervising the construction of the newsprint mill for Australian Newsprint Mills Proprietary, Limited. Mr. Sandwell's letter corrects a false impression current on the Pacific Coast, and in addition includes news of interest to men in the American and Canadian pulp and paper industry. We quote his letter in full:

Hobart, Tasmania,
November 8, 1940.

Mr. Harlan Scott
The Editor
Pacific Pulp & Paper Industry
71 Columbia Street
Seattle, Washington

Dear Mr. Scott:

I have just run across a paragraph in your August issue which suggests that I am remaining here in Tasmania as Manager of the mill now under construction. This statement is not in accordance with the facts and I think a correction is called for.

Mr. L. R. Benjamin, who is very well known on the Pacific Coast of North America, is, and has been since the inception of Austrialian Newsprint Mills Pty. Ltd., the Company's General Superintendent and is in charge of the entire operation.

I was engaged as Chief Engineer to construct the mill with the understanding that I would continue to act in that capacity for a period after the commencement of operations. The first unit is now very close to completion, despite extraordinarily difficult conditions created by the War, in which Australia is playing a very important role.

Our original plans included for a program of orderly expansion which we contemplated would be spread over a fairly long period but War conditions may render it desirable to expedite the program. We are already actively engaged in planning our first expansion.

You are, I believe, aware of the fact that the first unit referred to above includes a groundwood mill and machine room, housing a high speed 170-inch Walmsley machine. We will start up on a furnish comprising eucalyptus groundwood and news grade sulphite pulp, the latter being imported from Powell River

L. R. BENJAMIN, General Superintendent, Australian Newsprint Mills Pty., Ltd., Hobart, Tasmania

The BOYER MILL of AUSTRALIAN NEWSPRINT MILLS PROPRIETARY, Ltd., near Hobart, Tasmania ' ' ' This picture, sent by P. SANDWELL, consulting engineer of Vancouver, B. C., who designed the mill and supervised its construction, was taken November 2nd as the plant neared completion ' ' ' L. R. BENJAMIN is General Superintendent and the paper mill superintendent is E. W. G. COOPER, formerly assistant paper mill superintendent of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation at Camas, Washington.

and Ocean Falls. You will be interested, I am sure, in the recent photograph of the plant, copy of which I enclose herewith.

Some of your readers may also be interested to know that my son, Mr. P. R. Sandwell, who until recently was assistant to the Chief Engineer of the Paper Machinery Department at Dominion Engineering Works, has now been appointed Resident Engineer for Australian Newsprint Mills.

He joined me in Tasmania some months back and has been actively engaged in the mechanical engineering of the mill under construction.

I take this opportunity of wishing you and the staff of **Pacific Pulp & Paper Industry** and the many readers of your magazine with whom I am personally acquainted, a very happy Christmas and a prosperous New Year.

Very sincerely yours,

P. SANDWELL.

P. SANDWELL, Chief Engineer, Australian Newsprint Mills Pty., Ltd., Hobart, Tasmania

Camas Issues New Paper Making Volume

● A second edition of the book "Paper Making" has recently come from the press. This is the text used in the paper school at Camas, Washington, for the employees of Crown Zellerbach Corporation. There were 600 copies in the first edition and 500 copies in the second edition. Authors of the book are Natwick, Nunn and Rawlings.

A few minor changes were made for the second edition.

Ekholms Vacation in California

● Erik Ekholm, general superintendent of the Puget Sound Pulp & Timber Company at Bellingham, Washington, accompanied by Mrs. Ekholm and their son, Howard, spent two weeks vacationing at Carmel, California, the last of October.

Much of the time was spent on the golf links and both Mr. and Mrs. Ekholm acquired real sun tans.

Pulp and Paper Making Course Being Given in Los Angeles

● A general course in pulp and paper manufacture is being given at the Fremont Evening High School in Los Angeles by John Van Ounsem, chief chemist for the Pioneer Division, The Flintkote Company. Classes are held from 7 to 9 p. m. every Tuesday and Thursday evening and the course will last for twenty-six weeks from October 8th when the meetings began.

Sixty men are enrolled from paper mills, paperboard plants and allied industries in Southern California. There is no charge for this course.

Mr. Van Ounsem has organized the course upon the following basis:

1. Brief outline of history of pulp and paper making.
2. Sources of fibrous raw materials.
3. Manufacture of pulp.
   a. Preparation of pulpwood.
   b. Manufacture of mechanical pulp.
   c. Manufacture of sulphite pulp.
   d. Manufacture of alkaline pulp.
   e. Treatment of pulps.
   f. Bleaching of pulp.
   g. Pulping of fibres other than wood.
4. Processing waste papers for re-use in papermaking.
5. Non-fibrous raw materials.
   a. Sources and properties of fillers and loading.
   b. Sizing of paper.
   c. Coloring of paper.
   d. Water and Steam.
6. Paper making machines.
   a. Fourdrinier machines.
   b. Cylinder machines.
   c. Machine drives.
7. Auxiliary mill equipment in the paper mill.
8. Paper finishing.
9. Coated papers.
10. Paper testing.

Guest speakers will give talks from time to time on subjects related to the course. Early in the course Herman L. Joachim, consulting pulp and paper mill engineer of Los Angeles, spoke before the group on the "United States Production of Wood Pulp."

Motion pictures will also add interest to the course. Among those to be presented is "Magic Fibers," a talking picture of the pulp industry in Washington which was produced earlier this year by the Puget Sound Pulp & Timber Company and the St. Regis Paper Company, Kraft Pulp Division.

Mr. Van Ounsem, who organized the course and who is serving as instructor, has been associated with the Pioneer Division, The Flintkote Company for the past six years. Prior to coming to the Pacific Coast he was with Arthurd D. Little, Inc., of Cambridge, Mass., and the U. S. Forest Products Laboratory in Madison, Wisconsin.

Sutherland to Expand Paper Milk Bottle Plant

● The Sutherland Paper Company has announced plans for the immediate erection of a $50,000 addition to its plant in Kalamazoo, Mich., to house its paper milk bottle unit. It will be one story steel and concrete, 375 feet long and 70 feet wide, on the New York Central siding. The company recently bought the Purity Vessels Company, of Baltimore, and much of the equipment from that plant will be taken to the new building and installed.

The interior of the new plant will be lined with cream colored tile to meet the strict sanitary requirements of the industry. Approximately 40 more employes will be added to the payroll as a result of the expansion. An order for 20 carloads of paper milk bottles to be delivered during the next six months has already been accepted.

Middlebrooks and Hannys See Game

● Paul Middlebrook, resident manager of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation at Lebanon, Oregon, was, with his wife, the guest of Jack Hanny and his wife at the Oregon-Oregon State football game at Corvallis on November 30.

TAPPI to Hold January Dinner in Camas

● The January dinner meeting sponsored by the Pacific Section of TAPPI, will be held at the Crown Willamette Inn in Camas, Washington, on Tuesday evening, January 7th at 6:30 p.m.

"Water Requirements in Pulp and Paper Manufacture," will be the subject under discussion that evening, according to an announcement by W. Norman Kelly, vice chairman of the Pacific Section and in charge of programs.

The discussion will be led by Edward P. Wood, technical director, Longview Mill, Pulp Division, Weyerhaeuser Timber Company, Longview. Assisting him will be William R. Gibson of the Northwest Filter Company, Seattle; a representative from The Dorr Company, and others familiar with water treatment problems in the pulp and paper industry.

Fred A. Olmsted, chairman of the Pacific Section, will preside.

Ten Months Imports Down 29.1% Below 1939

Imports from Canada up 40.3% over first ten months of 1939—Exports in October rise 23.5% over September—Great Britain largest buyer.

● The imports of wood pulp in October came from three countries but those from two of the three were very small. From Finland came 6 tons of mechanical unbleached in October. Sweden sent 582 tons of unbleached sulphate to the United States during the month.

Canada was the principal exporter to this country, sending 67,524 short tons. The total for October was 68,112 tons. In September 2,016 tons of pulp came from Finland, none from Sweden and 63,538 tons from Canada. Imports from Canada were up 3,986 tons or 6.4 per cent over September.

Total imports in September were 65,554 tons against the 68,112 tons in October, a gain of 2,558 tons or 3.9 per cent in the latter month.

Ten Month's Imports

● The imports of wood pulp into the United States, all grades, for the first ten months of 1940 amounted to 1,083,395 short tons, a decline of 444,784 short tons or 29.1 per cent below the 1,528,179 short tons imported in 1939.

The pulp coming in from Canada showed a big gain, 40.3 per cent over that imported in the same ten months of 1939, 698,342 short tons this year against 497,743 short tons a year ago. The increase amounts to 200,599 short tons.

Imports from all other countries show large decreases, those from Norway being down the most, 75.2 per cent, from 69,573 short tons to 17,190 short tons. The decline in imports from Finland amounts to 70 per cent, 80,772 short tons in the first ten months of the current year against 272,643 short tons in the same 1939 period, a drop of 191,871 short tons. Imports from Sweden have declined 344,479 short tons, 55.1 per cent, to 280,352 short tons in the first ten months of 1940 as compared with 624,831 short tons in the same period of 1940.

October Wood Pulp Exports

● Exports of wood pulp from the United States in October amounted to 39,965 short tons, a gain of 7,618 short tons or 23.5 per cent over the 32,347 short tons exported in September.

The exports in October, 1939, totaled 21,622 short tons. The increase in October, 1940, exports was 18,343 short tons or 85 per cent.

During October of this year 9,372 short tons of rayon and special chemical grades of bleached sulphite were exported. Bleached sulphite of paper grades amounted to 4,422 short tons. Unbleached sulphite exports in October were 5,506 short tons. Bleached sulphate pulp exported totaled 2,498 short tons and unbleached sulphate in the amount of 17,344 short tons was shipped out of the country. All other pulps totaled 823 short tons, including 217 tons of soda pulp.

Great Britain took almost the same tonnage of wood pulp from the United States in October as in September, 10,888 short tons in October and 10,891 short tons in September. Great Britain was the largest single buyer in October.

Japan was in second place in October as a buyer of United States pulp, taking 9,746 short tons. Australia and New Zealand took 6,313 short tons putting them in third place. Mexico was fourth with 4,650 short tons, and the South American countries were in fifth place with a combined total of 2,966 short tons.

COMPARISON OF WOOD PULP IMPORTS

(Tons of 2000 Pounds)

From:	Ten Months 1939	Ten Months 1940
Finland	272,643	80,772
Norway	69,573	17,190
Sweden	624,831	280,352
Other Overseas	63,389	6,739
Total Overseas	1,030,436	385,053
Canada	497,743	698,342
Total Imports	1,528,179	1,083,395

Source: U. S. Department of Commerce, Bureau of Foreign & Domestic Commerce.

COMPARISON OF WOOD PULP IMPORTS

September and October, 1940

(Tons of 2000 Pounds)

Type of Pulp:	Finland		Norway		Sweden		Canada		Total All Countries	
	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.	Sept.	Oct.
Mechanical Unbleached	———	6	———	———	———	———	13,187	12,903	13,187	12,909
Unbleached Sulphite	374	———	———	———	———	———	18,567	18,391	18,941	18,391
Bleached Sulphite	58	———	———	———	———	———	21,189	25,112	21,247	25,112
Unbleached Sulphate	1,584	———	———	———	———	582	5,478	5,933	7,062	6,515
Bleached Sulphate	———	———	———	———	———	———	4,191	4,354	4,191	4,354
Soda	———	———	———	———	———	———	926	831	926	831
Total	2,016	6	———	———	———	582	63,538	67,524	65,554	68,112
Percentage of Change from Previous Month	—82.1%	—99.7%	———	———	———	———	—12.2%	+6.4%	—21.6%	+3.9%

Source: U. S. Department of Commerce, Bureau of Foreign & Domestic Commerce.

IMPORTS OF WOOD PULP INTO THE UNITED STATES

(Tons of 2000 Pounds)

	Sept. 1939	Sept. 1940	Oct. 1939	Oct. 1940	1940 over 1939 Sept.	Oct.
Finland	33,654	2,016	28,281	6	—94%	—99 %
Norway	4,202	———	15,108	———	———	———
Sweden	53,724	———	88,561	582	———	—99.3%
Canada	68,356	63,538	75,255	67,524	—07%	—10.2%
Total Four Countries	159,936	65,554	207,205	68,112	—59%	—67.1%

Source: U. S. Department of Commerce, Bureau of Foreign & Domestic Commerce.

COMPARISON OF WOOD PULP EXPORTS

(Tons of 2000 Pounds)

	Ten Months 1939	Ten Months 1940
Rayon and Special Chemical Grades	30,625	97,715
Other Bleached Sulphite	17,925	91,261
Unbleached Sulphite	29,028	60,770
Bleached Sulphate	†	17,657
Unbleached Sulphate	13,005	130,781
All Others	**9,374	*13,207
Total	99,957	411,391

* Includes 8,454 tons of soda pulp.
** Includes 3,508 tons of soda pulp.
† Included under All Others.

Source: U. S. Department of Commerce, Bureau of Foreign & Domestic Commerce.

Water Treatment to Be Discussed by TAPPI

● Lewis B. Miller of the Keasbey and Mattison Company and chairman of the Water Committee of the Technical Association of the Pulp and Paper Industry has announced an excellent program for the Water Session to be held during the annual meeting of the Technical Association on February 17-20, 1941, at the Roosevelt Hotel, New York, N. Y.

Rudolph Richter of the National Container Company and F. J. Lammers of the International Filter Company will discuss "Water Treatment as Practiced at the National Container mill in Jacksonville."

R. Tutt of the Peter Cooper Glue Company will relate experiences in "The Use of Sveen Glue and Its Effect on the Water in a Paper Mill."

A. R. Johnson of the Dorr Company will describe the operation of the Magnetite Filter plant at the Escanaba Paper Company mill.

Eskell Nordell of the Permutit Company will talk on "Conditioning Water with the Spaulding Precipitator."

L. B. Miller will discuss "Chemical Coagulants for Water Treatment."

The Water Committee is now preparing an interesting and valuable monograph on Process Water. This will be ready in 1941.

Stamm Sees Son Play in Big Game

● The 46th annual "Big Game" between California and Stanford at Berkeley, Nov. 30, had more than usual interest for Ed P. Stamm, logging manager of the Crown Zellerbach Corporation, for his son was a star left tackle on the Stanford team which beat the Golden Bears 13-7. Young Ed's play was highly commended by the sports writers. Mr. and Mrs. Stamm came down from Portland to see the game, and spend a few days in the Bay Region.

Powell River Exporting Pulp

● Powell River Company continues to ship unbleached sulphite pulp to the British Isles in parcel lots, but deliveries have been affected considerably by shipping losses, especially in recent months.

Shortage of ships is also interfering to a less extent in shipments of pulp to Tasmania for the Derwent Valley newsprint mill. Pacific Mills, Ltd., the other British Columbia newsprint plant which is sharing with Powell River the supply of pulp as a base for Tasmanian production, has had a similar experience.

Latest advices from Percy Sandwell, the British Columbia engineer who supervised construction of the Australian mill, financed jointly by the commonwealth government and Australian publishers, are that the mill will go into production early next year.

Australia Restricting Timber Imports

● British Columbia's timber industry will suffer heavy losses as a result of the further tightening of import restrictions.

So far, no change has been made in the reductions ordered several months ago in connection with Australia's newsprint imports, but war conditions and the need for conserving dollar exchange have brought about considerable decline in paper consumption there.

The new restrictions became effective December 1. Summarized, they call for total prohibition of all redwood and cedar; 40 per cent reduction in the quota for Douglas fir, to be based on the value of imports during the past twelve months; 40 per cent reduction in hemlock imports until March 31, 1941; 75 per cent reduction from April 1 to June 30, 1941, after which hemlock will be excluded absolutely.

So far as known, Australia is not importing any hemlock for pulp-making purposes. Most of the hemlock is being used for manufacture of boxes and general construction.

Inland Empire Making Improvements

● The Inland Empire Paper Company at Millwood, Washington, east of Spokane, is running at capacity producing newsprint and sulphite and groundwood specialties, according to Chester A. Buckland, general manager.

A new Pope reel was recently ordered from Rice, Barton & Fales of Worcester, Massachusetts, and will be installed the first of the year on the 156-inch Rice, Barton newsprint machine. A new Seybold trimmer, 64 inches in width, has been ordered and will be installed in the finishing department late in February.

The latter part of November the mill was completing the installation of a two-stage cylinder washer with top couch rolls on both cylinders. The new washer, with rifflers ahead of it, will be used on magazine stock.

A new constant temperature-humidity testing room will shortly be constructed according to plans being prepared by Myron Black, technical director and sulphite superintendent.

Christensen Reports On Kapuskasing Weather

● Andreas "Christy" Christensen, who joined the Spruce Falls Power & Paper Company, Ltd., at Kapuskasing, Ontario, as sulphite superintendent this summer after several years as technical adviser to the British Columbia Pulp & Paper Company, is finding the temperatures much lower in Ontario.

He writes, "My firm resolve to wear shorts all winter has received a severe setback during the past 48 hours. A 22 degrees below zero breeze whistling up your pants leg has got some convincing arguments in favor of long underwear. It might interest you on the Pacific Coast that the average yearly temperature at Kapuskasing is 28 degrees Fahrenheit, or 4 degrees below freezing. It takes a lot of sub-zero weather to offset the summer temperature when on several occasions it reaches 100 degrees in the shade.

"I have traded my car for a dog team, packed away my fishing tackle for the season and expect to devote my leisure hours to skiing, curling and singing the praise of the Northern lights."

Mr. Christensen's address is P. O. Box 576, Kapuskasing, Ontario.

Hogue Dies At Powell River

● Herman Thomas Hogue, 56, for many years mill foreman for Powell River Company, died September 1. He was a native of Lexington, Va., and went to the British Columbia paper town soon after the mill went into production, in 1912. He was manager of the Powell River baseball team for years.

Japanese Centralize Rayon Textile Exports

● The newly established 5,000,000 yen Japan Rayon Textile Export Promotion Company is expected to begin functioning in December. It will buy and sell all rayon products for export on an exclusive basis, will regulate production for export, and undertake to standardize products and regulate export prices.

McMaster Sees Shortage In Unbleached Sulphite Pulps

● Blockade of exports from northern Europe and inevitable readjustment of overseas markets are developing an increasing shortage in certain grades of wood pulp, and British Columbia is well situated and equipped to meet the demands of that situation by establishing new mills, according to A. E. McMaster, for many years an active figure in the pulp and paper industry here.

Mr. McMaster has just completed a new survey of the pulp situation with particular reference to its effect on the Pacific Northwest. He finds that a shortage in unbleached sulphite pulp will probably become serious by early 1941, and that it can be overcome only by providing added manufacturing capacity or by sacrificing exports.

The latter course is so inconsistent with the foreign policies of Canada and the United States as to be hardly worth consideration, states Mr. McMaster, who points out that the only alternative is to increase manufacturing facilities. "There is natural hesitancy in making the large capital investment involved," he says, "in view of the uncertainty of the position after peace is restored, but there is no physical difficulty in the way except, perhaps, some delay in securing part of the equipment. Construction would probably take about a year from the time of commencement."

Mr. McMaster points out that the important problem facing new enterprises of this kind is the nature of the competition which will have to be met when European exports are resumed. Before the war, the advantages held by European mills included low mill costs, low freight rates and favorable monetary exchange. The result was that at times prices in the United States were depressed below the ability of many domestic mills to meet.

While Mr. McMaster admits the folly of attempting to predict with any hope of accuracy the competitive situation to prevail after the war, he believes that the implications of these factors should be considered:

● 1. Germany, Austria and Czechoslovakia all exported pulp in normal times prior to the war. Through the exigencies of her economic position, Germany has developed many new uses for wood pulp in substitution for other materials. It is probable she will have extended this practice to some controlled territories and that it will be found practical and economical to continue permanently at least some of these uses. The timber resources of most of the German-controlled countries are limited. Continental Europe has imported some 2,000,000 cords of pulpwood annually, principally from Russia and Finland. In terms of pulp equivalent, this represents at least 1,000,000 tons.

● 2. Russia has been short of woodpulps for some years and will undoubtedly absorb the entire excess production of the Baltic states now incorporated into Soviet Russia, as well as that of the recently acquired part of Finland.

● 3. Considering these developments, we can expect a diminution in the exports from Europe in the post-war period. Exports of sulphite pulps from these countries to the American and Pacific groups in 1937 are estimated at 450,000 tons.

● 4. Another factor of significance is that the Scandinaviation industry has about reached the limits of its capacity on a sustained yield basis. This will ultimately redound to the benefit of the industry of North America.

"When peace finally comes, it seems obvious that in the stupendous task of rehabilitation and reconstruction the keynote of the deliberations of statesmen must be stability," states Mr. McMaster. "An application of this principle to international trade and commerce should eliminate or at least modify unfair competition between foreign and domestic producers in the United States markets, and thus enable well situated economic mills in North America to maintain their fair proportion of the market under all conditions."

Mr. McMaster's exhaustive survey is accompanied by supporting statistics and other data showing world production and consumption of the various grades of pulp and indicating the probable future trend. He emphasizes the wide-sweeping effect on markets following wartime blockade of the export pulp trade of the Scandinavian and Baltic countries. Some pulp has moved out of Finland to this continent via Petsamo, he points out, but not in sufficient volume to affect calculations.

"The position is clear that Canadian and United States mills have the responsibility of supplying not only the domestic requirements of their two countries, but those of the rest of the Americas, Australia, British India, East Indies, China, Japan and Great Britain," Mr. McMaster contends.

The magnitude of this responsibility is indicated by the fact that European producers exported to the markets mentioned above a total of 2,105,000 tons in 1937, the United States taking 903,000 and Britain 830,000 tons of the aggregate.

● Despite the absence of shipments from Scandinavia for some months, the shortage in unbleached pulp as forecast in this appraisal has not yet been seriously felt, partly due to the accumulation of heavy inventories earlier in the year. Mr. McMaster expects the shortage to be acute, however, in the early months of 1941.

The apparent short position might be improved somewhat by modification of blockade conditions, which seems unlikely; substitution of other chemical grades for unbleached sulphite; elimination of Japan, temporarily, as a market; reduction in estimated domestic consumption; greater utilization of paper stock. But Mr. McMaster considers it obvious that a serious shortage will develop unless more manufacturing facilities are provided.

The Pacific Northwest, Mr. McMaster believes, has all the qualifications necessary for moderate expansion in the industry and he is convinced that mills established at well-selected tidewater sites would be sound and profitable.

Canadian News Producers Paying Dividends

● Holders of Canadian newsprint securities have been encouraged by recent increase in dividend payments.

St. Lawrence Corporation, which derives all of its revenue from Brompton Pulp & Paper Company, has increased the regular quarterly dividend from 20 to 25 cents a share, and has declared an extra dividend of 90 cents a share, making a total distribution out of the year's earnings amounting to $1.75. Last year the distribution was $1.10 a share.

Directors of St. Lawrence Paper Mills declared $2 on account of arrears as well as a quarterly dividend of 50 cents a share, the first since 1931.

These dividend declarations are significant as in the case of St. Lawrence Corporation payments declared this year call for disbursement of $521,624, and they indicate that the company has received a revenue from its stock holdings in Brompton of an equal or larger amount.

No statement regarding dividends has been made so far by Brompton, but it is expected that they will amount to at least $1.75 a share on the 300,000 of common outstanding.

Under ordinary circumstances Abitibi would pay its full bond interest, and there has been some agitation to empower the receiver to pay interest charges until the reorganization has been effected. The company is over-supplied with working capital.

Price Brothers are paying regular dividends on their preferred stock and, even allowing for maximum payment of the excess profits tax, should be able to show profits available on its common stock as a result of operations this year.

Consolidated Paper Corporation will undoubtedly show its full bond interest and depreciation covered. How much remains for the common stock is problematical, but the company does not have to meet bond interest until next July, by which time it is expected that interest will be paid in cash. This is on the assumption that net working capital will be in excess of $10,000,000 as called for under the agreement between the company and bondholders.

Canadian International Paper Company's financial statement will most likely show gains, as in previous years. No dividends are expected to be paid on capital stock, however, in view of the heavy indebtedness to the parent organization.

Great Lakes Paper is expected to have a larger distribution on capital stock this year. What Donnaconna Paper will do is still a matter for conjecture, although it is known that earnings have shown substantial improvement.

Dividend policy will depend a good deal on what the Canadian government decides with respect to payment of excess profits tax. This decision will also vitally affect Pacific Mills, Ltd., the British Columbia subsidiary of Crown Zellerbach Corporation, which earned $334,927 during the last six months reported, and Powell River Company, the other west coast newsprint mill, which is a private company.

Japanese Pulp and Paper Situation

● The American Commercial Attache in Tokyo, Japan, reports through the Bureau of Foreign & Domestic Commerce, U. S. Department of Commerce, as follows:

"Total pulp imports were officially reported at 17,726 long tons during June, including 3,594 tons of paper pulp and 14,132 tons of rayon pulp. Of this amount, imports from Manchuria accounted for approximately 4,000 tons and presumably the balance represented arrivals from the United States and Canada. Total pulp imports for the first 6 months of 1940 amounted to 86,764 long tons, against 85,679 tons in the 1939 period. Arrivals of paper pulp fell from 14,818 tons to 12,364 tons, while imports of rayon pulp increased from 70,861 tons to 74,430 tons.

"At the end of June, the finance authorities issued permits covering approximately 11,600 tons of pulp for July shipments, of which about 10,000 tons represented pulp supplied by firms located in the United States. Permits covering August shipments were issued on about July 27.

Pulp Self-Sufficiency?

● "Press reports issued toward the close of July state that investigations recently made by the Ministry of Commerce and Industry have indicated that the rayon pulp output of Japan and Manchuria will total 245,000 tons during the 1940-41 year, or approximately 55,000 tons less than the amount normally required by the rayon and staple fiber industries. During the following year pulp mills will achieve a potential production capacity of 353,000 tons, if present expansion plans are executed successfully. It has been officially estimated, however, that the 1941-42 output will be in the neighborhood of only 302,000 tons. The two new plants under construction which are expected to increase the nation's rayon pulp supply are the Tohoku Development Co.'s plant and that of the Kokusaku Pulp Manufacturing Co. The former will have a capacity of 35,000 tons and the latter a capacity of 60,000 tons, it is reported.

Further Restrict Newsprint

● "A further restriction on the use of newsprint was imposed by the Ministry of Commerce and Industry on June 29, 1940. Effective from July 1, consumers of newsprint had their allotments reduced by 7½ to 10 per cent from the previous quotas. Press reports also indicate that the authorities will soon impose drastic restrictions on the publication of weekly and monthly magazines and journals in a further effort to reduce paper consumption.

"Production of foreign-style paper by the members of the Japan Paper Manufacturers' Association reached 165,583,000 pounds during June, a gain of almost 1 per cent over the output of the previous month, but a 4.1 per cent drop from the June, 1939, production. Production for the first 6 months of 1940 totaled 979,425,000 pounds, a decline of 1.3 per cent from the output during the first half of 1939.

"Paper sales amounted to 165,108,000 pounds during June, an increase of 1,998,000 pounds over the sales of the previous month, but 5,410,000 pounds below the level of the corresponding period of last year. Total sales for the first half of the year were 65,321,000 below the level of the same period of 1939, amounting to 961,831,000.

"Paper imports were negligible during June, arrivals being valued at only 42,087 yen. Exports totaled approximately 12,500 short tons during June, or 1,100 short tons below the May level. Total shipments during the first half year reached 84,085 tons, lower by approximately 5,000 tons than exports during the first half of 1939. (American Commercial Attache, Tokyo.)

Bean Stalk Pulp

● "The Manchuria Bean Stalk Pulp Co., a project jointly sponsored by the State and Japanese textile interests, finally completed its plant at Kaiyuan on July 2. The company expects to produce 5,000 tons of pulp during the remainder of 1940. In the few months of its operation this mill has only worked at 27 per cent of capacity, owing to the difficulty of obtaining beanstalks. It requires 85,000 tons of stalks to operate at full capacity, and measures are being taken to obtain this material from the indifferent farmers."

Paper Production Increasing in Australia

● Australia's paper industry is expanding to a notable degree. An announcement recently made by the chairman of Australian Manufacturers, Ltd., pointed out that the company's new mill at Maydale, Victoria, is now operating at its maximum capacity of 30,000 tons annually, and that arrangements are being made to raise this figure by 9,000 tons.

The new high speed paper machine that was erected by the company alongside its new pulp plant, is capable of turning out approximately 25,000 tons of paper a year. It is claimed to be one of the most modern and efficient paper machines of its kind in the world, and will produce certain new types of paper not manufactured heretofore in Australia. In his public statement the chairman asserted that his company had raised its production of paper and boards from the previous maximum figure of 89,000 tons a year to approximately 110,000 tons. The latter figure includes 60,000 tons of boards and 50,000 tons of various types of paper.

Owing to the steadily increasing demands for the company's products, no difficulty is expected in keeping all machinery running at full capacity. (Totals cited are long tons of 2,240 pounds.)

U. S. Envelope to Build New Converting Plant

● The United States Envelope Co., Pacific Coast Division, will build a new converting plant in Los Angeles, according to an announcement by E. V. Johnson, executive of that company. Plans call for ground to be broken early in December and completion for the beginning of manufacturing is scheduled for March next year.

Mr. Johnson arrived in Los Angeles Nov. 11 to conclude negotiations for the land and final arrangements for the launching of the new plant. He returned east Nov. 22. F. S. Fairchild, who is in charge of the San Francisco plant of the company, will also be in charge of the Los Angeles plant.

The building will be erected on land owned by the company for some time on East Twelfth Street, one block west of the Zellerbach Paper Co. offices. It will front on Twelfth Street with a total frontage of 115 feet. The building will be a single story, modern manufactory, constructed so to form the first unit of a group to be completed at a later date. It will have a floor space of 30,000 square feet. Equipment will be installed for the manufacturing of envelopes, printed and plain. The converting of other items may be added later.

In the Los Angeles offices at present are L. T. Mork and Jack Chancellor. A personnel of 100 will be required to operate the new plant. The home office plant of the company is at Springfield, Mass. There are eight plants in as many cities throughout the country.

Announce Program for Coating and Graphic Arts Sessions

● An interesting program has been arranged for makers and users of coated and printing papers at the Coating and Graphic Arts session of the annual meeting of the Technical Association of the Pulp and Paper Industry to be held at the Roosevelt Hotel, New York, N. Y., February 17-20, 1941.

In the Coating Session the following papers will be presented:

"The Internal Bonding Strength of Paper" by E. Sutermeister and H. W. Osgood, Jr., S. D. Warren Company.

"Performance of Machine Coated Papers and Scope of Their Application" by G. K. Dickerman, Consolidated Water Power and Paper Company.

"Requirements of Base Papers for Varnish Coatings," by Victor P. Ryan, Crown Cork and Seal Company.

"Opacity Variability as a Measure of Coated Raw Stock Performance," by F. H. Frost, S. D. Warren Company.

"Staybelite Resin," by J. H. Long and A. C. Dreshfield, Hercules Powder Company.

● In the Graphic Arts Session the following papers will be presented:

"Inks and Their Relation to Paper," by George Cramer, Sinclair and Valentine Company.

"A Method of Conditioning Paper for Multi-Color Offset Printing," by C. G. Weber, National Bureau of Standards.

"Geodetic Survey Map and Chart Printing," by D. P. Barnet, U. S. Coast and Geodetic Survey.

"Tack Measurements for Printing Papers," by A. E. Gessler, Interchemical Corporation.

"Specific Surface Measurements of Fine Particles," by A. E. Gessler, Interchemical Corporation.

Trade Talk

of Those Who Sell Paper in the Western States

Closing the Deer Hunting Season

● With the appearance on this page of the remarkable photograph of a four-point buck, the 1940 deer season is officially closed by PACIFIC PULP & PAPER INDUSTRY.

It is rumored that a controversy is raging in the San Francisco sales offices of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, as to whether this fine specimen came from the wilds of California or from the Fleishhacker Zoo.

One version of the story involving this mysterious deer is that Wally Moore, sales manager of Crown Willamette's napkin division, shot a fine buck while on a recent hunting trip, but no one could be found who would give an affidavit that the buck pictured is the one shot by Mr. Moore.

Another version, and one that has found wider acceptance, alleges that the hunting was done in the new Fleishhacker Zoo right in San Francisco, the buck being bagged at dinner time before it could take off its feed bag and jump over the fence. The identification collar is still around its neck and some say that this fact proves the claim that it came from the zoo.

While there is a question as to the stories there is no question but that Millard Rawlings of the Crown Willamette sales department and formerly stationed at the company's Camas, Washington, mill, obtained an excellent "candid" shot of the four-point buck at dinner time.

Northwest Men Among Prize Winners

● In the recent National Paper Trade Association contest for the best answers to questions raised by paper buyers, two Pacific Northwest men placed in the contest over answers to question No. 4.

"Your paper is O. K., but I have to have it on these terms," was the question. The answer sent in by J. W. Murphy of Carter, Rice & Co., Corp., Portland, Oregon, won second prize.

S. R. Spencer, Spokane Paper & Stationery Company, Spokane, Washington, won fourth prize.

Zellerbach to Handle L. L. Brown Lines

● The L. L. Brown Paper Company, Adams, Mass., announces the appointment of the Zellerbach Paper Company as distributor of L. L. Brown's Linen Ledger, Greylock Linen Ledger and Advance Bond in San Francisco, Stockton, Fresno, Oakland, Sacramento, San Jose and Reno. The first and last papers mentioned are made from 100% new, white rag fibres, while Greylock Linen Ledger is made from 85% new rag cuttings.

BM&T Men Work On Community Chest

● Each year finds the leading business men of San Francisco taking an active part in the collection of funds for the outstanding local charitable organization, the Community Chest.

Included among the leaders in this year's activities are a number of Blake, Moffit & Towne executives. James K. Moffitt is treasurer of the permanent Chest committee and chairman of the finance committee. J. W. Towne is a colonel in the campaign organization, while his brother, A. W. Towne, is a member of the central committee.

Sales Manager L. C. Conner, and F. L. Lange are also active workers in the drive.

The employees, too, like those in San Francisco's other paper houses, have caught the spirit of the drive, and have exceeded last year's total in a successful "over-the-top" campaign.

Ed Smith Recovering From Operation

● Ed Smith, head of the counter sales staff, Zellerbach Paper Company, San Francisco, is recovering from an operation at St. Luke's Hospital.

Esty of Carter, Rice Visits Coast Offices

● C. A. Estey, president and general manager of Carter Rice & Co., Boston, came to California last month, met C. H. Beckwith, Pacific Coast manager of the company, and in company with Mr. Beckwith paid a visit to Portland and Seattle.

Paper Men In National Guard

● Uncle Sam's bugles are blowing for at least two employees of the Zellerbach Paper Company.

Jack Gilbert, assistant to King Wilkin in the Headquarters Sales Department, San Francisco, was called to active service in the National Guard, as was Grover Wilson, printing paper salesman of the Spokane Division of the company, who is also a lieutenant.

Gronich Opens Fort Dearborn Paper Co.

● Lou Gronich, who formerly was sales manager for General Paper Company in Los Angeles, and went east a short time ago to conduct business in Chicago, returned to Los Angeles early in December. He has opened an office under the name of the Fort Dearborn Paper Co. The Chicago firm of that name is reported to be a large operator in mill seconds.

Pell Shows Movies To Customers

● Rodman C. Pell, head of the Pelican Paper Co., San Francisco, is not only prominent as a Pacific Coast paper merchant, but he is also noted as a globe-trotter, lecturer, and moving picture photographer.

And these latter attributes tie in very nicely with the first because Pell uses the moving pictures he has taken to help the paper business along. He has a series of six colored motion pictures that he has taken in the far places of the world, and every other month he rents the Community Theater in San Francisco, giving a certain number of tickets to his paper salesmen.

The salesmen distribute these tickets free to the customers of the Pelican Paper Co. and the theater is jammed on the night of the lecture and movie.

There are absolutely no plugs for the Pelican Paper Co. given either in the picture or in the lecture. It is the same lecture that Pell gives before paying audiences all over the Pacific Coast.

The most recent of these motion picture lectures was December 11th, when Pell showed his well known picture "Palestine Under Martial Law."

"I've found this to be effective advertising," says Pell, "to fill the theater up with your customers and their friends and give them an entertaining evening."

Paterson Holds Open House for Printers

● C. G. Bennett, assistant sales manager of the Paterson Pacific Parchment Co., San Francisco, was host to 75 members of the San Francisco club of Printing House Craftsmen, at Paterson's magnificent new building.

The printers were most interested in the new building and its various appliances and processes. As a souvenir of the occasion the Paterson Pacific Parchment Co. presented those at the meeting with a facsimile of one of the original manuscripts of the Star-Spangled Banner. Of further interest also was the fact that the covers for the magazine published by the craftsmen last month were of Paterson Parchment.

Victor Hecht a Grandfather

● The reahon Victor E Hecht, vice-president of the Zellerbach Paper Company, San Francisco, was wearing a smile broader than usual November 15, was that his only daughter, Mrs. Eugene Kahn, of Los Angeles, had brought a fine new baby daughter into the world, making Mr. Hecht a grandfather for the first time. The infant has been named Susan.

L. L. Brown Paper Co. Issues 1941 Calendar

● The L. L. Brown Paper Company, Adams, Mass., is now issuing its 1941 calendar. As it emphasizes permanent record paper, a conspicuous and appropriate feature is an impressive illustration of the new Archives Building in Washington, D. C. The calendar shows 12 months on a single sheet with the accumulated number of each day indicated under it. Despite the large number of numerals involved, the design is such as to combine unusual attractiveness with maximum legibility.

Fresno Reports Three Zellerbach Babies

● A welcome "epidemic" of new babies struck the Fresno Division of the Zellerbach Paper Company between Nov. 22 and 27. Three employees became fathers for the first time during that period.

W. R. Parker became the father of a girl, on the 22nd; W. M. Harrison became the father of a boy on the 25th; and M. M. Myovich also became the father of a boy on the 27th. Boy, was the cigar smoke thick around the office!

Blake Bowling Team Leading

● The bowling team representing Blake, Moffitt & Towne, San Francisco, is now the leading paper house group in the strong Graphic Arts League of the Bay City.

BM&T's Annual Calendar Contest

● Footlines on the familiar Blake, Moffitt & Towne calendar this year to be one of the best, are chosen after careful consideration of some two or three thousand entries in the annual "Footline Contest." Any employee may submit a line, and if it is accepted, receives an award. The calendars are distributed to customers and friends along the entire Pacific Coast.

HERE IS THE ULTIMATE in the application of functional design to millinery . . . Whether you agree with that high brow statement or not you will admit this papier-mache coffee cup and saucer makes a better looking 1941 model hat than a great many of those seen on the streets.

Designed to advertise Red and White Coffee sold by the Red and White Food Stores throughout the country, it will be worn during December and January by the girl clerks to remind customers to buy coffee . . . Yes, the cup will actually hold coffee, but it is not recommended for this purpose while being worn on the head.

Fine Christmas Issue Of "Informant"

● Of unusual interest and beauty is the Christmas issue of the Zellerbach Paper Company's house organ, The Informant, of which Vice-President Victor E. Hecht is collator, and Mrs. Glory M. Palm, assistant.

The number is done in silver and wine color and is printed on Warren's Cumberland Gloss—White—Sub. 80.

Beside an inspiring message on making people "Christmas conscious" this year, as never before, the Informant contains a center spread of "Volumes of Greetings" from all the division managers of the Zellerbach Paper Company.

Fran Jenkins Introducing New Papers

● Fran Jenkins of Los Angeles, Pacific Coast representative for the Kimberly-Clark Corporation, was busy during December visiting Zellerbach Paper Company branches and customers up and down the Coast.

The purpose of his trip was the introduction of Kimberly-Clark's three new process coated "Levelcoat" book papers, "Multifect", "Kimfect", and "Truefect".

The new papers will be distributed by the Zellerbach Paper Company, who handle Kimberly-Clark papers on the Pacific Coast.

Visitors to Coast Paper Trade

● R. C. Wilke, vice-president and secretary of the Leader Card Works, Milwaukee, was a recent visitor to the Coast.

John Kluge, vice-president of Otten Bros., Inc., Detroit, was visiting friends on the Coast last month.

E. V. Johnson, vice-president of the United States Envelope Corp., Springfield, Mass., was visiting the trade last month.

Harry B. Conklin, president of Louis Dejonge & Co., New York, was a recent Coast visitor.

R. C. Clark, vice-president of the Eastern Manufacturing Co., and formerly general sales manager of the Los Angeles Division, Zellerbach Paper Company, was a recent Pacific Coast visitor.

G. Bothwell, head of the cover paper department of the Hammermill Paper Company, Erie, Pa., was a recent visitor to the West Coast.

James R. Carter III, sales manager of the Nashua Gummed & Coated Paper Co., Nashua, N. H., was a recent Pacific Coast visitor.

Walthers Acting Manager Zellerbach at Kansas City

● Due to the resignation of Ralph Lane, the Zellerbach Paper Company has announced the appointment of Edward H. Walthers as acting manager of the Kansas City Division of the company.

Lane had been with the Zellerbach company since 1935, when his firm, the Lane Paper Co., was taken over by the Zellerbach organization and became the Kansas City Division of the company.

Walthers has been connected with the Zellerbach Paper Company for a number of years, more recently in San Francisco.

Paper Men Holding Christmas Party

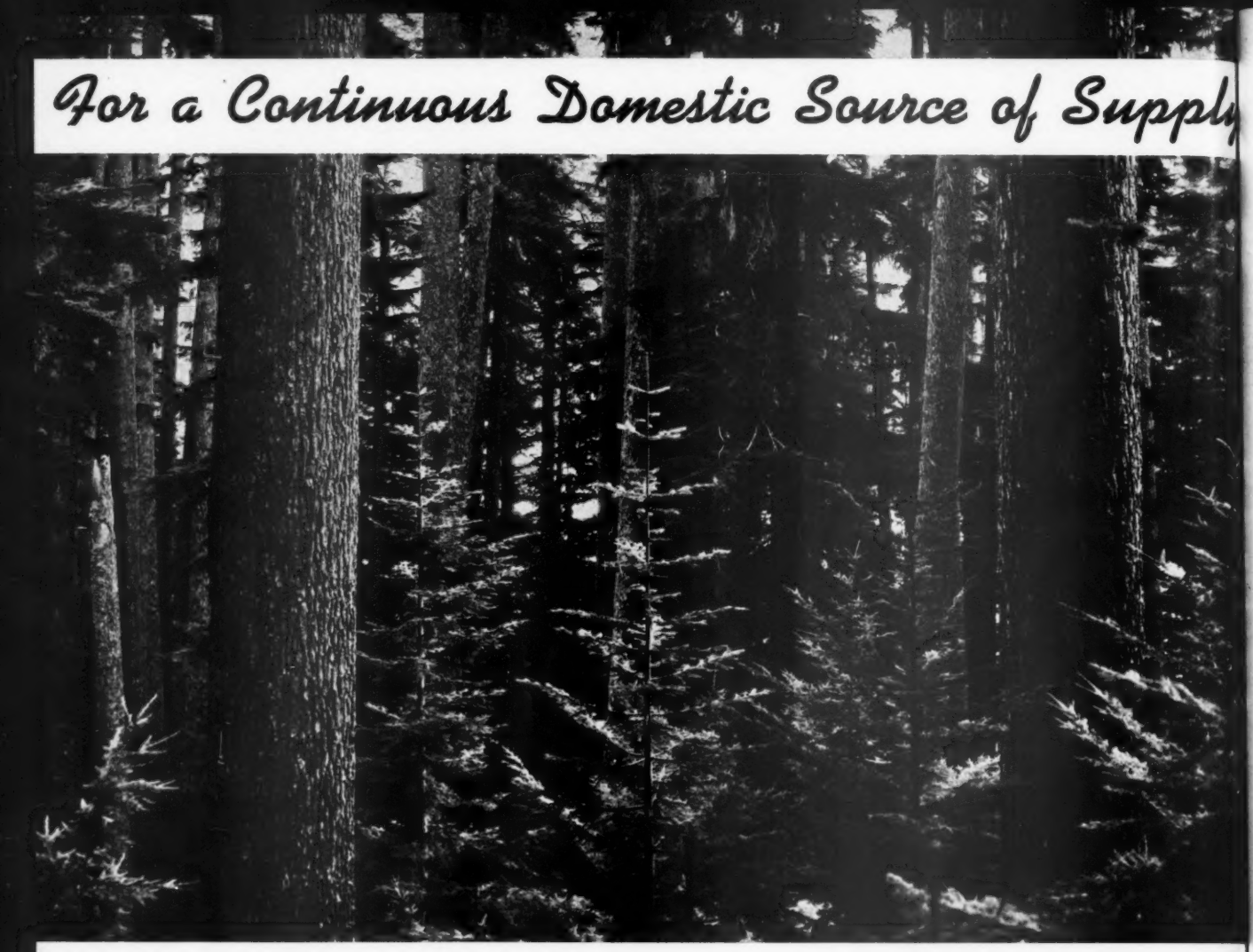
● One of the finest activities of the Paper Mill Men's Club of Southern California is its annual Christmas Party. Eeach year a group of underprivileged boys is selected to be the guests of the club at dinner. This year the party will be given December 19th and the boys, twenty-five in number, will be a group from the Salvation Army sponsored Red Shield Club.

At four o'clock in the afternoon the boys will be picked up and taken to one of the Southern California paper mills. They will be given an educational tour of the plant. Following this they will be taken to Carl's View Park Cafe for a six o'clock dinner. The dinner for the boys is being donated by Carl. It will be a turkey dinner with second and even third helpings for any of the lads that get that far.

The committee, headed by Gerry Thiem, and composed of Wm. Charbonneau, Merle Paup and F. S. Van Amberg, has obtained the boys names and sizes in advance so that an individual gift of a woolen sweater of proper size may be given to each boy. There will be a bicycle as a prize, a radio, and for those boys not getting these prizes, a football or a good baseball mit. For those boys whose families will want them, a basket dinner including a turkey will be provided.

Following the meeting an excellent bill of entertainment will be presented which will please both guests and members.

For a Continuous Domestic Source of Supply



American industry is faced today with the greatest challenge it has ever known. It is asked—almost overnight—to speed up production—to produce phenomenal quantities of essential materials to meet a national emergency.

In line with Rayonier's established policy of—

a Continuous Domestic Source of Supply

it will lend its fullest support to the program of an adequate domestic supply of dissolving and paper pulps on its customary proven *quality* basis.

Better Pulps for Better Performance

RAYONIER
INCORPORATED

For a continuous domestic source of supply

EXECUTIVE OFFICES:	MILLS	SALES OFFICES:
343 Sansome St. San Francisco	FERNANDINA, FLORIDA HOQUIAM, WASHINGTON PORT ANGELES, WASHINGTON SHELTON, WASHINGTON TACOMA, WASHINGTON	122 East 42nd St. New York City

Blake Now Has 16 Branches

● The year 1940 saw Blake, Moffitt & Towne celebrate its 85th anniversary as pioneer paper merchants in the west. The year also saw the chain of Blake, Moffitt & Towne divisions increased to a total of 16 with the opening of a house at Spokane, Washington. The chain of houses now extends from border to border on the West Coast and covers markets of five western states.

Vaughan Describes Tested Papers

● Frank P. Vaughan, Chicago, head of Tested Papers of America, Inc., was heard by sales managers from each of the 16 divisions of Blake, Moffitt & Towne, at a recent meeting in San Francisco.

Blake, Moffitt & Towne are exclusive distributors for tested papers on the Pacific Coast. A series of truck signs have been promised to further sales of these items. The first sign showed the group of five items—this was followed by a sign featuring the household towels.

Zellerbach Basketball Team Placed Fourth

● The Zellerbach Paper Company team placed fourth in the city-wide San Francisco basketball series. Oscar Williams is captain of the group.

Jaggards Vacation At Palm Springs

● B. P. Jaggard, West Coast representative of the Hammermill Paper Co., with headquarters in San Francisco, took a two week's mid-winter vacation with Mrs. Jaggard at Palm Springs.

Fick Serving With National Guard

● Genial Johnny Fick, who worked in the San Francisco Receiving Department, Zellerbach Paper Company, and who is a lieutenant in the National Guard, has left for special training at an eastern camp.

Great Northern Paper Makes Success of Newsprint

● With the recent declaration of an extra dividend of 50 cents per common share by the Great Northern Paper Company of Maine, eastern newspapers commented upon the company's record of almost unbroken dividend payments for 30 years.

Great Northern, the largest newsprint producer within the United States, will have paid $2.50 per common share during 1940 with the payment of the extra 50 cents. Last year the company paid $2.40.

In the first nine months of this year Great Northern earned $2.12 a share on its sole capitalization of 997,480 shares of $25 par stock. The company has no bonds or preferred stock outstanding. Great Northern's operations are integrated in northern Maine, the company controlling some 1,500,000 acres of timberlands. Around 100,000 horsepower has been developed out of over 300,000 potential water horsepower on its own property.

British India Market For Pulp and Newsprint

● British India may be regarded as a potential market for pulp and paper from the Pacific Northwest, but British Columbia mills in the past have been too absorbed with meeting demand in markets closer home to expand their sales in that distant field, according to Paul Sykes, former trade commissioner for the Canadian government at Bombay.

Mr. Sykes, who is spending a few days in Vancouver, reports that India is no longer able to obtain pulp or paper from the northern European producing areas except for a negligible amount of Finnish stock shipped through Petsamo. Most of the Canadian pulp and paper now used in India is from the eastern provinces while Newfoundland is also sharing in the business, shipping via the Cape of Good Hope. Some miscellaneous papers have been supplied to India by west coast mills, says Mr. Sykes.

India possesses no native woods suitable for newsprint manufacture, according to the trade commissioner. He says that several years ago an Indian newspaper issued a special edition made from "all-India paper," but the material was not newsprint and no serious attempt has been made to manufacture newsprint in that country.

During his stay in Vancouver Mr. Sykes will confer with export sales officials of Powell River Company and Pacific Mills, Ltd., regarding the possibilities of the Indian market.

Impco Savealls For Hawley

● Improved Paper Machine Corporation savealls are being installed on No. 2 and No. 3 paper machines of the Hawley Pulp and Paper Company mill at Oregon City. These are to be used for reclaiming fibres in the white water which had formerly been lost. The Impco equipment was bought through Ken Hall, Portland, Ore.

Duck Call Brings Pigs

● Rowell Paine, pulp grader for the Everett Mill, Pulp Division, Weyerhaeuser Timber Co., has been taking a lot of kidding since a recent duck hunting trip. Paine and Wendell Muffley were out north of Everett hunting and Paine tried out his brand new duck call. To his surprise two very large pigs came running out from under a nearby barn in response.

South Discovers Forestry

● "Those of us who watch and record such things," says I. F. Eldredge, director of the Southern Forest Experiment Station at New Orleans, "have noted more practical interest in forestry in the South in the last 5 years than in all of the 25 years that preceded them. You will find this to be true in all walks of life: Editors, bankers, state and county officials, teachers, industrialists, business men's associations, and on out to the man at the country crossroads. Much of this awakened interest is the fruitage of many years of widespread educational work, but there is something deeper behind it all. We now realize that we can no longer depend upon crop production alone to lift us into economic parity with our sister states of the Union, that we must have more factory pay rolls if we are to solve the knotty problems presented when a steadily increasing population faces a declining number of jobs.

"When we take stock of the natural resources available to support a greatly increased industrialization we find that our forests, which cover 6 out of every 10 acres in the South, offer the greatest promise. We note, too, that present annual growth of the neglected forests now occupying our strong forest soils is not sufficient as a sound base for the expansion we must have. Further study reveals that the yield of our forests can be doubled by intelligent forestry management, and that if our local forest industries are built up to the highest degree of processing and use which our forest soils under good management can support, we can take a long step in the direction we want to go.

"So we have come to see forestry as a vital, realistic thing and as one of the truly significant means of putting our region on the road to a sound and permanent prosperity."

Imports of Canadian Sulfur Increase in First Half

● Although sulfur is exported from Texas and Louisiana in substantial quantities, says the Bureau of Foreign and Domestic Commerce, the United States is importing increasing quantities of Canadian sulfur. The Canadian material is recovered from smelter gases at Trail, B. C., where the Consolidated Mining & Smelting Company has a tremendous plant, and moves by rail to pulp mills in Northwestern states. Aside from sulfur of Canadian origin, there are importations of sulfur of high unit value from the United Kingdom.

Imports of Sulfur and Sulfur ore into the United States

Country of origin	1938		1939		First 6 months	
	Lbs.	Value	Lbs.	Value	Lbs.	Value
Canada	5,525,057	$48,806	30,992,055	$222,984	33,666,028	$242,402
Chile	114,308	562	77,326	445	44,092	604
Denmark	165	8				
France			710	66		
Germany	21,363	1,249	12,344	614		
Italy			529	10		
Japan	3,786	149	1,524	109	520	31
Norway			154	6		
United Kingdom	166,478	21,691	219,898	26,633	69,853	9,922
Total	5,831,167	72,465	31,227,214	250,422	33,780,493	252,959

CHART RECORDS of TEMPERATURE PROCESSES

Insure Uniform Quality at Lowest Cost

In the process of bleaching you can't "bargain" with temperature —it must be measured accurately and held within close limits when fluctuations either high or low mean a loss.

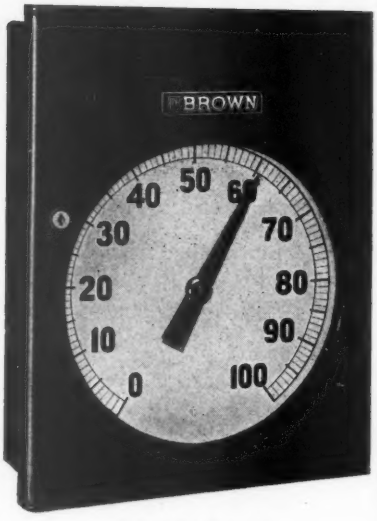
Chart records from Brown Thermometers are a safeguard in maintaining uniform quality and preventing losses due to "drops and rises."

Brown Recording, Indicating and Controlling Thermometers—due to their accuracy, simplicity and ruggedness—more than meet the fast-growing demands for exact and higher standards of measurement and control. They are the choice of many leading manufacturers in the paper industry because they can be depended upon to hold the process within the desired limits wherever heating or cooling is involved.

Among the features offered in Brown Thermometers are: Powerful flat spiral actuating elements . . . Automatic Chart Timing . . . Overload Safeguard . . . Universal Rectangular Case for either flush or front-of-board mounting and many other features of advanced design which assure easy installation and long time accuracy.

Brown Thermometers are furnished as mercury, gas or vapor actuated types, one, two or three-pen models. Electric and air-operated controllers for temperature processes from —40° F. to 1200° F. or equivalent Centigrade. Wherever Brown Thermometers have been put in charge, reduction in spoilage, improved quality and increased output have quickly followed.

Without obligation our engineers will be glad to recommend the proper Brown Thermometer and Minneapolis-Honeywell Control System for modernizing your process temperatures. Write THE BROWN INSTRUMENT COMPANY, *a division of Minneapolis-Honeywell Regular Co.*, 4438 Wayne Avenue, Philadelphia, Pa. Offices in all principal cities. Pacific Coast Sales Offices: 420 S. San Pedro St., Los Angeles; 1136 Howard St., San Francisco; 303 Selling Building, Portland; 403 Terminal Sales Building, Seattle.



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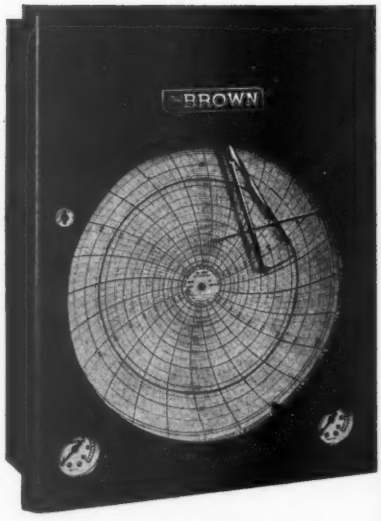

RECORDING CONTROLLER

BROWN THERMOMETER CONTROLLERS

and

MINNEAPOLIS-HONEYWELL CONTROL SYSTEMS

To Measure and Control is to Economize

Using the Forest Crop

by W. H. PRICE*

Men really began to use the forest crop of the Pacific Northwest in 1823 when a sawmill saw first bit into a Douglas Fir log at Vancouver, Washington. The use of the companion trees of Cedar, Spruce and Hemlock followed commercially as the decades rolled by.

Cruising over the face of the earth in an imaginary airplane, a hundred and seventeen years later, we look down upon the fir-timbered roof of a public building in Germany; that little spired church over there in Holland is of Douglas Fir; those barges leaving Rotterdam grew on the slopes of the Cascades; the deck of that British battleship in the Mediterranean is fir from Western Washington; and so is that piling on that dock in Manila, that scaffolding in Uruguay; those oil derricks in Baku look suspiciously like Douglas Fir; and so do those mining timbers in Chile; those must be Douglas Fir gates on the locks of the Welland Canal; and so too are the pipe lines over the Andes Mountains; and those Chinese railroads are moving on steel which is gripped by Douglas Fir ties. Over there in that library at the University of Washington the reading room is full of the future leaders of the Northwest, learning from books and magazines and newspapers—the products of the harvest of hemlock—free knowledge for free men—as fine a use as any to which man has yet put the forest crop. Thus in a century have trees been woven into the warp and woof of the fabrics of life.

Trees and Industry

Upon this world-wide use of the Douglas Fir forest crop a great industry has been built; an industry which gives employment to over 60% of the industrial workers of the Pacific Northwest; an industry which furnishes the railroads with 67% of their outbound freight traffic, which gives the steamships 80% of all the freight they haul from this area; an industry which supports more than one-third of the entire population. The creation and perpetuation of this industry, based upon the use of the forest crop has commanded the services of strong men, men of courage and vision, men of power and energy, men of ingenuity, men in the offices, in the laboratories, in the woods and in the mills, and men at every crossroads—men who would not be stopped by any obstacle.

Into this industry has been poured the savings of many people—savings which have gone for research, to carry on experiments, to multiply the uses of wood fiber so that today there are over four thousand products of the forest available to the people of this continent. Through the use of the forest crop wages have been paid to capital, without which there would have been no research, without research no machinery, without machinery we would still be fashioning forest products by hand. By using the forest crops hundreds of millions of dollars have been paid to men and women in wages and salaries. Through the use of the forest crops railroads and ship lines have been woven into an interlacing network of transportation. Through the use of the forest crops local, county, state and federal governments have derivevd a considerable portion of their expanding revenues. Revenues from the use of the forest crop have provided the sinews, the A B C's for much of our educational system from the primary grades through the university.

The first man who made the first undercut in a Douglas Fir tree fashioned the first link in a chain of events that has bound up and kept in condition the vital strengths of a democratic nation— homes, schools, churches, factories, and paper for the carrying of the news and knowledge of the world to a progressive people. Each year through the investment of capital in engineering and research, the men of the Forest Products Industry are fashioning more links in this chain of unity by using more trees, and more of every tree. This is a chain that binds men together in the comradeship of production, that makes every man a player on a team whose goal is the creation of more necessities and more luxuries for an ever-widening group of people.

When the Civil War was at its height in 1862, Congress passed the Morrill Act, introduced by Senator Morrill of Vermont. It set in motion one of the most ambitious educational programs the world has ever known—a program based to a considerable extent upon the use of the land and of the forest crop on that land. This Morrill Act established the land grant colleges — "land grant" because United States public lands were used to finance the founding of universities and colleges. This Act did three things:

1. It granted to each of the states 30,000 acres of land for each senator and 30,000 acres for each representative, based upon the census of 1860.

2. The leading object in the establishment of these universities shall be "without excluding other scientific and classical studies and including military tactics, to teach such branches as are related to military training and mechanical arts." It was also stated in the Act that these colleges were to provide "a liberal and practical education of industrial classes in the several pursuits and professions of life."

3. The money procured by the states from the sale of these lands and this timber, had to be invested, according to the Act, in Federal Bonds or in stocks yielding at least 5%. Only the interest on this endowment fund could be used for educational purposes and if the money was dissipated by the states for any reason, the states were required to make up the losses by public appropriations from the State Treasury.

Through this Act over 11,000,000 acres of land were appropriated to the states for "land grant" colleges. Speed characterized the action of the several states in disposing of the lands and the timber when it was received from the Federal Government. However, it is interesting to note that some of the states still hold some of the original land. The states of Washington and Oregon together received 180,000 acres under the Morrill Act.

Fifty-two colleges have been established throughout the United States by this fund, among them Cornell, Massachusetts Institute of Technology, The University of California, University of Oregon, State College of Washington. These fifty-two colleges and universities today cover a land area of 119,000 acres, possess 3,500 buildings and have for experimental purposes 67,000 acres of forest and agricultural land. The value of these institutions in 1928 was $427,000,000. 2,300 students were enrolled in these colleges in 1882, today there are over 160,000 students, and during the three-quarters of a century which has intervened since the Act was passed 400,000 degrees have been awarded by these institutions. Thus it will be seen that education in America has, to a considerable extent, stemmed from the use of the forest land and the forest crop. Today in the states of Washington and Oregon the use of the forest crop brings substantial revenue to support our schools and colleges. From the original Morrill Act and subsequent acts the State of Washington received a total of 2,800,000 acres. From the sale of timber and land to the amount of 500,000 acres the State of Washington has built up a permanent fund of $35,000,000, the interest on which goes towards the support of schools. The State still has 2,300,000 acres.

Speed—The Watchword of Men When Using Trees—Crazy-Quilt Ownership

The problems which we face today in using the forest crop to its fullest measure are rooted deep in the history of our country. From the ring of the first ax as it echoed against Plymouth Rock, down to the resounding whistle on a Washington skidder, "Speed" has been the watchword of men in using the forest crop. One of the results of this speed has been the creation of a veritable crazy-quilt of ownership of forest lands. Taking, for example, a Western Washington township in one of the operations of Weyerhaeuser Timber Company, we find that, besides land owned by the company and land owned by the state, there are 35 small forest land owners scattered through this portion of our tree farm.

When the public domain was parceled out as an incentive to attract people into the far places for the settling of a continent, the emphasis was placed upon the quickest and best utilization of the land at that particular moment. Little or no thought was given to planning for future forest crops. The Northwest Land Survey System, originating in 1785, was designed to divide land into mile-square parcels regardless of topography, drainage or value. The Preemption Act of 1841, the Homestead Act of 1862, the Desert Land Act of 1877, and the Timber and Stone Act of 1878, all were designed to hurry up the settlement of the western country. Speed was the slogan—there

*Presented at the Fall Meeting of TAPPI, Seattle, Washington, August 20-23rd, 1940. Forester, Weyerhaeuser Timber Company, Tacoma, Washington.

Glacier Park view, Courtesy of Great Northern Railway Co. Photograph by Hileman

Beautiful Pictures Owe Much

TO THE SULPHITE MILL

Pleasure for millions and it all leads back to the sulphite pulp mill! Little do those who derive both enjoyment and gain from photography realize how much is done by industry to make these possible. All along the line, some chemist, some plant is working for them and none is more important than the sulphite mill which produces not only the cellulose necessary for the production of film but the paper on which pictures must be printed in order to be enjoyed.

And, of course, the sulphite mill depends upon Sulphur as an essential raw material.

TEXAS GULF SULPHUR CO.
75 E. 45th Street New York City
Mines: Newgulf and Long Point, Texas

was no time to think of long-range programs for timber utilization. Land was cheap—so cheap that men scrambled to get the best and not a moment could be spared to plot out perfect patterns of ownership.

The railroads were potentially the great unifiers of the continent. They had pushed their lines part way across the nation, ran out of cash and were marking time. They needed money and they needed it quickly. Where and how could the railroads find the wherewithal they could use so handily? The continent was covered with timber. This timber belonged to all the people—all the people as exemplified by "the Government." The people wanted the continent bridged quickly. Wasn't there some way this timber could be used? They reasoned this way—if the railroads had some of the people's timber they could sell it for cash. Probably the railroads would do business quicker and better than "the Government." And so, under the Railroad Land Grants—Really a help-settle-the-continent-subsidy—land was traded to the railroads, by the people through their government, in the form of alternate mile-square sections in strips of 20 to 40 miles wide on each side of the right of way, in return for which the railroads were to extend their lines and thereby develop the country. In other words, these railroads, these bridgers of the continent, these unifiers of our nation received the red squares in a vast continental checkerboard.

The railroads were expected to sell these lands quickly, thus providing cash for the financing and completion of their transcontinental building programs. And, every foot of the continent must be settled quickly by the men and women of America, before the men of other nations claimed it. The railroads offered this land for sale for cash, and Frederick Weyerhaeuser and his associates were among the many purchasers. With the money realized from sales, the hard-up railroads completed their part of the bargain with the Federal Government by binding the west to the east with steel. A continent was united geographically and a nation began to flex its muscles.

Thus we see the owners of forest land multiplying in America — the Federal Government, the state government, the railroads and individual Americans with enterprise, initiative and vision.

Thus, briefly I have attempted to trace the period of land acquisition and have endeavored to show that speed and multiple ownership controlled the use of the forest crop while America was growing to manhood. Long-range planning of major industries, as we conceive it today, would have been ridiculous on the frontier.

Solving the Ownership Pattern

In using the forest crop the private timber owner is confronted today first with the Herculean problem of rearranging this patchwork ownership into an orderly tree farm that will supply a thousand men in a given town with permanent employment at the job of helping to furnish the American people continuously with forest products. Weyerhaeuser Timber Company has met this situation by cooperating with other private owners in the merging of forest lands into a common pattern so that the men and the management of already existing mills, and the communities which surround these mills, can look with greater confidence to a more secure future. This action has insured longer life for a number of towns in Western Washington. Much has been accomplished in this direction, but there is still a long way to go.

In the State of Washington 56% of all the forest land is owned by public agencies, and if this complex problem of ownership is to be solved in the interests of all the people, cooperative arrangements must be made between public and private timberland owners.

There is no question but what the people of Washington are united in their desire to have the forest crops of this state used in perpetuity for the benefit of all the people. They want continuous operations and steady employment, they want roadside beauty and protection for fish and game, and they want recreation areas. These desirable ends can be attained solely by cooperation between public agencies and private owners. It would be a great thing if some of the speed which has characterized the use of the forest crop in the past would be demonstrated in effecting a consolidation of the heterogeneous ownership of timber so that the desires of the vast majority of citizens of the State could be promptly realized —the building of a permanent forest products industry with all its attendant benefits to the present and future inhabitants of this area.

Solving the Natural Growth Pattern

But, this patchwork policy of land disposal which developed with our western frontiers is only one of the problems that the loggers must face in using the forest crop to the best advantage. Forest fires, insect ravages, windthrow, fungi and many other natural causes which have been going on for many centuries have made our virgin forests vary from tree to tree and from acre to acre so that the ownership pattern, while complicated, is nothing compared to this natural crazy-quilt. Our western forests are composed of a variety of different kinds of trees, growing together, side by side, branch to branch, root to root, Douglas Fir, Hemlock, Spruce, Cedar, White Fir and Noble Fir, each with a widely dffierent utility. These stands vary in density from 20,000 to over 1000,000 board feet per acre and the proportion of each species in the stand is never the same. The result of all this is that the greater per cent of the area in the Douglas Fir region is now composed of an overstory of old growth fir with an understory of the more tolerant species such as Hemlock, Cedar and Spruce. Again, repeated fires of the past have caused Douglas Fir to grow up in even-aged stands. Much of the timber in many of the areas has grown up in a limby condition producing a poor grade of lumber, while in other areas the timber is clean and the lumber grade produced is of high value. On still other areas the timber is defective and often worthless because of rot. And so, the commercial value of timber varies widely from area to area and from tree to tree and from log to log.

Systematic Inventories

Because of this varied condition of our forests, and because of the fact that the location of logging would inevitably move from the valleys to the steeper mountain slopes, it was found necessary early in the life of Weyerhaeuser Timber Company to make systematic inventories, to map the varied topography, and estimate the volume and grades of timber. In the early days the work of the cruiser was crude, his maps were rough, his estimates cursory and approximate. His work today is accurate, his topographic maps are of high engineering caliber.

Back in 1823 in Vancouver, Washington, a man, a log-jack, an ax, and an ox did the trick. The man picked his tree and went to work—very selective logging. Timber values have risen in the intervening years and the log-jack has become a skidder, the ox a railroad, while the trusty ax has been joined by an effective saw in the hands of skilled men.

Fact Finding

We are conducting experiments today in various types of timber which will lead us towards more accurate methods of inventorying our stands to ascertain what quantities there are on our tree farm in the shape of shingles, lumber, pulp, plywood and fuel. On one area of approximately 1200 acres of old-growth timber we have made a 100% cruise and tagged each tree so that the individual logs can be followed through the manufacturing processes. The facts we derive from this experimental area will be used to increase the precision of our inventorying methods on many areas.

On another area of approximately 1200 acres of second-growth Douglas Fir we are carrying on experiments to arrive at the best forest practice in this type of timber.

On still another experimental area consisting of even-aged spruce and hemlock, we are selectively logging some of the trees. We will then study the remaining stand with a view to determining whether or not it is good business to apply this type of cutting to wider areas. The facts derived from these studies constitute a valuable contribution towards improving utilization methods. Results obtained from this experimentation will be applicable to the various operations when, in the cycle of events, we will come to logging second-growth timber.

In our intensive study of an operating area not only do we have to know about the species, size, value and grade of the timber, but likewise we have to make and assemble topographic maps. The kind of equipment that will be necessary to harvest the timber depends, of course, upon the condition of the terrain, which in turn may dictate the degree of utilization and the types of timber which can be profitably logged. Dense timber in steep country usually requires railroad logging, going hand in hand with steam and cable yarding. Scattered timber on easier slpoes may permit truck logging with tractor yarding. Our foresters and engineers are continuously making maps and studying areas with all of these possibilities in mind so that our decisions can be made just as nearly as possible with scientific precision.

Harvesting our present crop of mature timber is but a part of a continuous cycle of cutting, of seeding, and of regrowing timber so that the men and the management of our company will be in a position to furnish society with uninterrupted supplies of forest products. Forestry is not something separate and apart from the timber business. We cut a tree today because its value is greater now than its potential value will be if left for a future harvest. A mature tree is not growing to any appreciable extent; often it is decaying at a rapid rate which means that it costs money to leave it standing. It is good business for society to cut and use this tree and make way for a vigorous new tree. The forester looks at a stand

of timber not as something sacred to be preserved for posterity (although no citizen has a greater respect for and love of trees as trees than a forester), but he looks at it as an accumulation of many different grades and sizes of trees, each with two price tags—one tag upon which is written the value of the tree if logged today and the other tag its value if logged ten, fifteen, or fifty years hence.

Fire—Enemy No. 1

We have touched upon the development down through the years of techniques of evaluating our timber stands and methods of engineering followed in long-range operations. We have shown how the utilization of our present old-growth timber supplies is but one part of our program designed to produce uninterrupted supplies of forest products. This whole program falls to the ground if we do not solve the menace of fire. In spite of decades of experience we never know just when or where a fire is going to strike the forest crop, but we may always be fairly certain that when it does strike it will travel at lightning speed, often in the opposite direction to the one we had expected it to take. It starts, turns with the wind, goes back upon itself and completely reverses its course destroying logging camps, timber, young trees, reforesting lands, cold decks, yarding engines, sometimes towns and villages, and occasionally lives are lost by the attacks of the Public Enemy No. 1 of the present and future forests. All talk of sustained operations, roadside beauty, timber is a crop, renewable resources, is idle unless fire is kept away from all trees, young and old. Progress has been made in the prevention and suppression of fires, but there is still wide room for improvement. The cooperative program designed to unite all the people of our commonwealth in a state-wide campaign of education to "Keep Washington Green" has already produced tangible results and gives a strong lead as to how to approach the solution of the other forest problems.

Taxation

No discussion of the use of the forest crop would be complete without some mention of the problem of taxation. The pressure of taxation upon owners of small tracts of timber to liquidate their holdings in short order is understandable. This pressure forces many owners to take the tenderloin and leave the rest of the animal to waste away. It is not necessary to stress the fact that this, from the point of view of the total economy of the Pacific Northwest—past, present and future—is short-sighted, inefficient utilization of that portion of the timber crop so handled. It should be emphasized that through this pressure process distressed owners are forced to salvage what they can from their investment. This is bad business all the way around.

The ingenuity of many experts has been challenged in trying to find an equitable taxation system because timber is a crop which takes not a year, but a century to ripen. I believe that it is perfectly fair to say that no signal which has yet come out of numerous huddles is the one that the whole team wishes to follow. However, it may be that reducing tax rates during the time the trees are growing and producing no immediate income for the owners, and raising the tax rates at the time the crop is harvested and producing immediate revenue, may be one way out. Every time we find a way of improving the forest taxation system in the interests of the owner, the worker and the consumer we thereby stimulate a more orderly utilization of the forest crop and widen the area of opportunity for planning for future forest crops.

Longview Branch, An Integrated Operation

Our Longview operation presents an excellent example of the integrated use of the forest crop. Here the company has a tree farm sufficient in size, and with a reasonably good balance of old-growth and new forests, to permit planning operations in perpetuity. Fifteen years ago, when it seemed the time had arrived to begin the systematic use of the forest crop at Longview, the management designed and built manufacturing plants that would make the best possible use of the stands of timber in the light of the knowledge possessed at that time. Through intensive research in these fifteen years we have expanded our program of utilization at Longview by using hemlock, which has, up to now, been somewhat of a stepchild in the forests. Now hemlock goes to the pulp mill. Research in the laboratories of the pulp and paper industry has done more probably to expand, and develop and widen the uses of the forest crop than has the work done at any other point on the forest products industrial front.

Growing out of this research and planning we have today at Longview a pretty well integrated use of the forest crop. Logs for the Longview mills are harvested on the slopes of Mt. St. Helens. These stands are approximately 70% Douglas Fir, 20% West Coast Hemlock, and 10% Western Red Cedar. Logs are hauled by locomotive, 50 miles to the Columbia River where they are dumped, sorted and routed to the sawmills according to species, size and grade. The large fine-grained, soft, old-growth yellow fir logs are sawed in Mill 1, where high quality lumber is produced. Mill 2 manufactures the smaller type of Douglas Fir logs which are admirably suited for such products as structural timber and framing lumber for house construction. Mill 3 is a very adaptable unit which saws cedar and hemlock logs. The cedar is used for the company's western red cedar exterior sidings and shingles. The hemlock logs, after a small percentage of the clear lumber has been removed, are broken down into cants or pieces which are conveyed to the pulp mill adjacent to Mill 3. The chips are conveyed on belt conveyors to the chip bin one-half mile away. This bin holds four days supply and is so constructed that effective blending of the chips is accomplished before they are conveyed to the digesters. These chips are converted into bleached sulphite fibre by the usual chemical process.

Careful, qualitative, and quantitive measurements are made at every step of the pulp manufacturing process. As a result of this careful study of the recorded factors in the manufacturing process, problems arise and opportunities for research open up which are turned over to the research department. Here they are worked on by scientific men, resulting in more effective means for the conversion of wood into a pulp quality to meet the evermore exacting demands of consumers, and into new products as well. This evaluation of operating conditions, going hand in hand with operating research, leads to a better utilization of more of the materials available in the forest as well as the recovery of by-products.

The shingle mill has fourteen machines to saw shingles out of blocks cut from the red cedar logs produced in Mill 3.

Shavings planed off fir lumber are taken to the presto-log plant where they are compressed into fuel to be used for heating and cooking.

Selling

The life-work of the Weyerhaeuser Timber Company, men and the management, consists in growing, converting and selling the forest crop. There would be no point in growing successive crops of trees unless they could be converted, at a profit, into products which an ever-widening circle of the American people would buy regularly. In days gone by it has been said that lumber sold itself—that anybody who wanted a board went to a lumber yard and bought it. This has not been true for a very long time and today Weyerhaeuser Timber Company sells its forest products, with the exception of pulp, through a company, Weyerhaeuser Sales Company. This company was created for the purpose of rendering a service desired by the American people — furnishing uninterrupted supplies of forest products of qualities that meet their requirements and at prices which they can afford to pay.

The pulp division sells its own products through its own sales organization located at strategic points. I do not need to tell you gentlemen that intense competition from foreign countries and the varying competition within our own country, from one section to another, further complicates the complete utilization of the forest crop.

We Use the Crop As We Find It

We are today endeavoring to use the forest crop as we find it. Confronted with multiple ownership; faced with widely variegated assortments of raw material; up against a national economy that permits foreign products to easily invade the home market, it has been no easy task to integrate the growing, converting and selling of forest products to the world.

At the beginning of this paper I mentioned the far-flung front held by the forest products of the States of Washington and Oregon. These positions have not been taken easily, they have had to be stormed and conquered by a sales organization of trained men whose job was first to convince the American people that "Timber is a Crop" and that they wanted forest products made from these crops and not substitutes; and secondly that the products produced by our company are synonymous with quality, price, service and permanence.

Conclusion

In conclusion, Using the Forest Crop in America boils down about like this:

From the time the Pilgrim Fathers first gazed into the impenetrable depths of the unknown forests which stretched away endlessly and ominously behind Plymouth Rock in Massachusetts, down to the present day when cruisers accurately estimate the timber stands on the slopes of Mt. St. Helens in the Cascades of Washington, the trees of America have presented a challenge to the men of America—a challenge in utilization. Because the Pilgrims needed food quickly and food came from the soil, and the soil was covered with trees, the trees had

to be gotten rid of quickly. And so the Pilgrims fought the forests with ax and saw and fire, and soon farms came smiling through. "Incidentally" best describes the manner in which our forefathers used the forest crop.

Lavish Utilization—1820 to 1876

The men of the growing colonies went one step further than the Pilgrims—they not only used the forests "incidentally," they used them for buildings, for fences, ships and railroads. They demanded building material in unheard of quantities and the men of the lumber industry responded and furnished the American people with the largest amount of fine building materials at the cheapest prices the world had ever known. The demand of the people for speed in the use of the forest crop is reflected in the policy of the Government of the United States which held out the forests as a bait, as an incentive to men and women to go out among the trees and subdue them and settle the continent—and settle it quickly.

This was the era of "Lavish Utilization"—a natural development because of the almost universal belief that the forests of America were inexhaustible.

Parsimonious Utilization—1876 to 1933

An abrupt reaction followed the "Lavish Era" and "parsimonious" best describes the manner of the use of the forest crop during the next fifty years. Fear seemed to dominate the use of the forest crop in this half century—fear of a timber famine. "Preserve the forest for future generations!" "Stop cutting the trees!" These were the guiding precepts of this period. The manufacturers of brick, tile, cement, steel and other materials which could be substituted for wood products had their innings and wide publicity was given to the notion that by the use of substitutes trees would be preserved for future generations.

Scientific Utilization—1933 . . .

We of today are not only using the forests for homes, schools, churches and factories, but we are using the forests more intensively in the making of pulp, rayon and furniture. Where the Pilgrims used the forest crop "incidentally," where the Pioneers used it "lavishly," where the Preservists used it "parsimoniously," we of today, profiting through observing the extremes of utilization to which previous generations went, are endeavoring to utilize the forest crop scientifically and more and more completely for the benefit of society, for today and for tomorrow. Because of progress through research, coupled with a broadening social objective, it is fair to say that the guiding motive of an ever-mounting number of forest managing agencies, private and public, is to serve the American people. That service consists in multiplying the uses to which the forest crop is put so that the American people shall have uninterrupted supplies of forest products of ever-increasing usefulness at prices which they can afford to pay; to provide continuous, profitable, and enjoyable employment for men and women; to furnish a permanent, profitable and attractive investment for public and private capital; to conserve the fish and game within the forests; to protect watersheds; and to maintain grazing areas. This objective can be attained only through a realization of the mutual interest which the American people have in using the forest crop—the mutual interests of loggers, operators, sawmill men, statesmen, chemists, papermakers, pulp workers, carpenters, architects—the American people.

Through scientific research we have seen the uses of the forest crop multiply to the point where today there are over four thousand uses of wood fiber. Foremost, in the very vanguard of this scientific progress, stands the Pulp and Paper Industry. The Pulp and Paper Industry has been the pace-setter of the Forest Products Industry in scientific research.

The Pilgrims looked at a tree and saw an Indian hiding behind it; the Pioneers looked at a tree and saw in it rough lumber and fuel and railroad ties; the Preservists looked at a tree and saw only beauty. The Scientific Man of 1940 looks at a tree and he sees all these values, plus pulp and paper and plywood and rayon and wallboard and all of the other four thousand modern products of the forests. He looks through the trees and through the forests and beyond he visualizes mankind using the forest crop in marvelous new ways—ways which today are hidden in the test tubes of science.

Pacific Mills Buys Canadian Bonds

● Pacific Mills, Ltd., Crown Zellerbach's Canadian subsidiary, has lent the Canadian government $500,000 for war purposes.

Such is the effect of the company's recent purchase of $500,000 of non-interest-bearing Canadian government bonds. Similar action has been taken by other large Canadian industrial enterprises. Pacific Mills previously made a $50,000 purchase of these bonds.

In addition, the Ocean Falls Company, Powell River Company, B. C. Pulp & Paper and Westminster Paper Company have bought extensively of the Canadian government's war loans.

The Abitibi Situation

● Application of the Montreal Trust Company for a new sale of Abitibi Power & Paper Company properties was adjourned in the Ontario supreme court recently subject to renewal on seven days' notice.

Argument at the hearing seemed to hinge on whether or not a sale would be appropriate while the royal commission appointed to investigate the case was still in session.

Opposition to the sale motion developed from equity interests as well as from the attorney-general of Ontario. The adjournment apparently will not interfere with renewal of the application should the commission's report be unduly delayed.

Publishers' News Stock Decrease in October

● Stocks of newsprint held by North American manufacturers showed an increase in October against a normal downtrend at that time. Stocks held by United States publishers normally rise in October but this year they declined 28,876 tons to leave a net reduction in stocks of both publishers and manufacturers.

At 255,943 tons, manufacturers stocks were up 21,606 tons over the total on September 30, but were 28,088 tons under the total on October 31, 1939.

Publishers stocks this year reached their low point at the end of April, and then rose nearly 130,000 tons to 410,126 tons at the end of September. In October, the upward movement was broken, total stocks of publishers dropping to 381,250 tons.

United States publishers held 364,207 tons of newsprint on October 1 and received 237,052 tons during October. A total of 261,028 tons was consumed, 1,020 tons were sold, to leave 339,211 tons on hand at the end of the month, making total stocks on hand or in transit of 381,250 tons.

Consumption in October was 9.6% over September, a normal increase. It was 1.3% ahead of October, last year. For the first ten months of 1940 consumption was 5.1% ahead of last year.

Seagulls and Rayon Pulp Don't Mix

● Every machine tender knows a long list of reasons for a sheet breaking but the men at the Shelton, Washington, division of Rayonier Incorporated have added a new one which will be filed under "S." Quoting the mill report:

"About 11 a. m. on November 27th we had a sudden sheet break in the dryer stacks of our No. 2 machine.

"The machine room crew, of course, immediately went to investigate. On the floor between the last section of stacks they discovered a seagull which was, for the moment at least, in not too good condition. However, one of the crew caught and carried the bird to the outside and on the way received bites on his arm and leg for his trouble. The bird was deposited just outside the machine room and in a few moments had disappeared, so evidently was none the worse for his experience, though it must have received some hard knocks and certainly went through some severe heat.

"It is probable that the gull entered the machine room through a monitor on top of the building, but it did so undetected.

"This was one operating difficulty we had not previously encountered.

"Production on the machine was interrupted for about 10 minutes until a new sheet was formed at the wet end, but only a small amount of stock will be returned to the beater.

"Our machine room foreman, Lefty Attwood, is of the opinion that we should have an open season on seagulls."

Laridon On Active Guard Duty

● L. B. Laridon, laboratory tester, Everett Mill, Pulp Division Weyerhaeuser Timber Company, has started his year's active duty with the National Guard at Camp Murray as a corporal.

Recent Advances in the Chemistry of Lignin

by F. E. BRAUNS*

IN the commercial production of pulp from wood and other plant materials these materials are digested at elevated temperatures with either an acid or an alkaline hydrolyzing agent. In both cases the purpose of the cook is the dissolution of the lignin and other non-cellulosic materials. The lignin in coniferous woods amounts to about 27 to 28 per cent whereas in deciduous woods its seems to be somewhat lower, carying from 12 to 24 per cent depending upon the method of determination applied. The non-cellulosic materials which also go into solution during the pulping process include some pentosans and hemicelluloses and amount to about 20 per cent. The non-cellulosic materials are also rendered solulable by a mild acid hydrolysis. With black spruce 18.5 per cent of the wood goes into solution when refluxed for one hour with one per cent sulphuric acid or for four hours with 7 per cent oxalic acid. The lignin and the methoxyl content of the hydrolyzed wood increase accordingly, indicating that a noticeable amount of lignin or of the methoxly-containing material is not removed during the hydrolysis. This however, does not mean that the lignin has not been changed by this treatment. That it has been partially changed is indicated by the fact that such hydrolyzed wood is not pulped as easily by a sulphite cooking liquor as an untreated wood, as has been shown again recently by Freudenberg. Deciduous woods, such as beech and maple, on the other hand, behave differently. On mild hydrolysis beechwood loses 29 per cent of its weight and maple 27 per cent, but in these cases neither the lignin nor the methoxyl contents increases accordingly. With beechwood the difference is not as great as with maple. In the first case, the lignin content increases from 20.3 to 27.4 per cent, in the latter from 18 to 22 per cent, whereas the calculated values, if no lignin or lignin-forming material had gone into solution, are 28 per cent and 29 per cent, respectively. The methoxyl content of the hydrolyzed wood, however, increases only from 5.6 per cent to 6.5 per cent in the case of beech and 5.36 to 5.68 per cent in the case of maple, whereas if no methoxyl-containing materials had gone into solution the methoxyl contents should be 8.0 and 7.35 per cent, respectively.

The fact that part of a methoxyl-containing material which appears in a lignin determination as lignin is removed on mild hydrolysis as a water-soluble material, can be used as a partial proof for Hilpert's theory, which states that lignin as such does not exist in wood but is a secondary reaction product and is first formed by the action of strong mineral acids on sensitive, partially methylated carbohydrates. That such methylated carbohydrate material is present in spruce wood has been shown by Ritter and Kurth. When the amount of methoxyl attached to the carbohydrate is taken into consideration, the methoxyl content of native lignin as it occurs in spruce wood is calculated to be 14.8 per cent. If the methoxyl in beechwood (5.8 per cent) is entirely attached to the lignin (24.4 per cent), the latter should have a methoxyl content of 27.3 per cent, whereas only 20.7 per cent is actually found. For maplewood the calculated methoxyl content is 26 per cent but only 19.8 per cent is found in isolated maple lignin.

One reason for this discrepancy is the fact that standard lignin determination methods are not suitable for deciduous woods as can be seen from the great variations in the lignin contents found for these woods in literature. Another reason is that a part of the methoxyl content is combined with carbohydrate material. For maple this amount is 1.24 per cent. Lignin, isolated from beechwood or maple according to Willstatter and Kalb, is obtained in 22.8 and 19.2 per cent yields, respectively, and a light yellow mother liquor results. When these mother liquors are diluted and heated, almost black precipitates settle out. These precipitates, after purification, have a methoxyl content of 9.45 per cent in the case of beech and 16.6 per cent in the case of maple. They are completely soluble in 5 per cent sodium hydroxide solution, in contrast to their Willstatter lignins, and are reprecipitated quantitavely by mineral acids but not by carbon dioxide. In this respect they behave like humic acids but differ from those prepared from fructose and other ordinary carbohydrates in their methoxyl contents. According to the literature the methoxyl content of natural humic acids is insignificant and it has been generally assumed that the presence of methoxyl groups is a significant difference between lignin and humic substances. The experiments with beech and maplewood, however, clearly indicate that this concept can no longer be maintined. The only difference between lignin and humic substances so far known is the presence of carboxyl groups in the latter.

The formation of methoxyl-containing humic substances also may support Hilpert's concept regarding the occurrence of sensitive methoxyl-containing sugars which form lignin-like products by a secondary reaction. However, there is no doubt that lignin in sprucewood is already preformed as such and is present as an aromatic compound. This has been proved again recently by Freudenberg who succeeded in isolating vanillin directly from sprucewood in a yield of 25 per cent (based on the lignin content). Hitherto it was generally believed that vanillin can be obtained only in small amounts from lignosulphonic acid and it is claimed that the yield of vanillin increases with the increasing degree of sulphonation. Freudenberg has shown that isolated Willstatter and Freudenberg lignins, lignosulphonic acid and, as mentioned before, even sprucewood, give vanillin up to 25 per cent when heated with caustic soda and nitrobenzene under pressure, indicating that the sulphonation of the lignin has no relation to the formation of vanillin and that all theories which are based on this reaction are invalid.

The formation of vanillin directly from native lignin also supports the concept first put forward by Freudenberg that spruce lignin contains in its building stone the vanilley[1] group. In recent years confusion has penetrated the lignin literature because the term "lignin-building unit" is used with two different meanings. Based on a series of experiments with various lignin derivatives, Hibbert, Brauns, and coworkers proposed an empirical formula for a lignin-building unit with a molecular weight of around

*Presented at the Fall Meeting of TAPPI, Seattle, Washington, August 20-23, 1940. Member of TAPPI, Research Associate, Institute of Paper Chemistry, Appleton, Wisconsin.

840. This unit is distinguished by the presence of one phenolic and one enolic hydroxyl group. The existence of a lignin-building unit of this size has been further shown by Sarkar, Hagglund, Holmberg, and Freudenberg. Recently, however, Hibbert and co-workers used the same term for a C6-C3 group of a molecular size of about 170, for which Freudenberg had introduced the term "lingin-building stone." In this paper, the term "lignin-building stone" will be used in Freudenberg's sense, for a C6-C3 group, whereas the term "lignin-building unit" will be used in the earlier sense—i. e., for a unit of 5 building stones with a molecular weight of about 840—in the same way as glucose is the building stone of cellulose and starch, whereas cellobiose and maltose are their respective building units.

The fact that lignin gives vanillin in yields up to 25 per cent leads us to the structure of lignin. The attempt to present a constitutional scheme for lignin has occupied lignin chemists for the last decade and, as we will later hear a detailed paper on this subject, I will mention this point only superficially. As early as 1897 Peter Klason, one of the earliest and most famous of lignin chemists, recognized the close relationship between lignin and coniferin, the glucoside of coniferyl alcohol, and an aromatic alcohol with a C6-C3 group. In 1920, he suggested that coniferyl aldehyde may be the basic building stone in lignin. This concept was further extended by Freudenberg who suggested, in 1933, that dihydroxyphenlyglycerol and its permutation derivatives from the building stones of lignin. The first experimental proof for the occurrence of a C6-C3 group in lignin was presented in 1931 by Max Phillips who succeeded in isolating a small amount of 3-methoxy-4-hydroxyphenylpropane of distillation of lignin with zinc dust and, more recently, by Harris of the Forest Products Laboratory in Madison who obtained on hydrogenation of lignin hexadydrobenzenepropane derivatives in almost 50 per cent yield. In 1938, Hibbert suggested in his guaiacol theory of lignin formation that lignin is a condensation product of guaiacol with 4-keto-oxypentanal. This is of interest in that, for the first time, a 5-membered side-chain in the aromatic nucleus is suggested. Because of his more recent discoveries, Hibbert and co-workers have now adopted the C6-C3 "building stone" for the basis of lignin formation. It may be mentioned that very recently Hachihama has claimed that he obtained, in addition to pyrocatechol, protocatechuic acid and p hydroxybenzoic acid, 3-methoxyl-4-hydroxphenylpropane (dihydroeugenol) in a total yield of 46.7 per cent on pressure hydrogenation of softwood lignin.

Five such C6-C3 building stones from a lignin-building unit of a molecular weight of about 840. The existence of such a lignin building-unit has been proved in several ways and Holmberg in a recent investigation of thioglycolic acid lignin finds that a lignin-building unit of the same size condenses with 4-thioglycolic acid groups. A further investigation of thiogylcolic acid lignin at the Institute has shown that these thiogylcolic acid groups react with lignin in such a way that their carboxyl groups are still free and can be methylated with the formation of methyl esters. These are seaponified by alkali with simultaneous splitting off of two thioglycolic acid groups. On further methylation of thioglycolic acid spruce lignin with dimethyl sulphate and sodium hydroxide, another thioglycolic acid group is split off, giving finally a methylated monothioglycolic acid lignin which has one thioglycolic acid group in the lignin-building unit. The manner in which the thioglycolic acid reacts with the lignin molecule is not yet clear. Isolated lignin, such as Willstatter lignin, also reacts with thioglycolic acid, giving a thioglycolic acid Willstatter lignin in which three thiolycolic acid groups have entered the lignin-building unit. That the hydroxyl groups of the lignin are not involved in this condensation reaction is shown by the fact that a fully methylated glycol lignin, in which all the hydroxyl groups are covered, still reacts with three molecules thioglycolic acid just as Willstatter lignin does. In contrast to the derivatives of the latter, however, the condensation product of the fully methylated lignin is now soluble in dilute caustic soda, indicating the presence of free carboxyl groups. A trithioglycolic acid lignin derivative was also obtained by Holmberg from ethanol lignin. The reaction between thioglycolic acid and lignin resembles that of phenol lignin in which four phenol groups react with the lignin-building unit of a molecular weight of 840 with the formation of phenol lignin A.

● The reaction mechanism of phenol and lignin is also still unknown and the structures so far proposed for lignin do not give any explanation for it. It was hoped that by using thiophenol instead of phenol some light might have been obtained on the reaction between phenol and lignin, as the introduction of mercaptan group might have facilitated the problem. This failed, however. It is true that thiophenol in the presence of a trace of hydrochloric acid dissolves lignin almost quantitatively and gives an almost white pulp, but the reaction product is a mixture of a number of condensation products from which a derivative, having 4 thiophenol groups per lignin building unit, has been isolated. Two of these thiophenol groups are more loosely bound and are split off on methylation with dimethyl sulphate and caustic soda. In the phenol lignin the phenol groups are more firmly combined with the lignin.

A further proof for the existence of lignin-building unit of a molecular weight of 840 is given by the studies of isolated native lignin—a lignin which has been isolated from sprucewood by extraction with an indifferent solvent at room temperature without the use of an acidic or an alkaline catalyst. Such lignin is obtained in a yield of about 2 to 3 per cent of the wood, or 8 to 10 per cent of the total lignin. It is obtained as a fine, very light cream-colored powder and has a methoxyl content of 14.8 per cent, which agrees exactly with that calculated for spruce lignin on the basis of the methoxyl content and the lignin content of the wood taking into consideration the part of the methoxyl content which, according to Ritter, is attached to carbohydrate material. This isolated native lignin gives all the typical lignin reactions, especially the brilliant purple color with phlorolucinol and hydrochloric acid. Recently it has been claimed that this coloration is not due to the lignin but to the presence of aldehydes, particularly vanillin and coniferyl aldehyde, in sprucewood. It is true that this coloration is not specific for lignin only, as other compounds, such as vanillin, give similar color reactions. It is impossible, however, that the color reaction of native lignin from sprucewood is due to the presence of such impurities, for native lignin is precipitated from its dioxane solution into ether or benzene which are good solvents for impurities of this kind. Another proof that the color reaction is caused by the lignin itself is that on exhaustive methylation of native lignin with diazomethane in anhydrous dioxane solution, a partially methylated native lignin is

obtained which no longer gives the color reaction with phloroglucinol. The same observation is made with sprucewood itself.

● When sprucewood is methylated with diazomethane it loses its ability to give not only the color reaction with phloroglucinol and hydrochloric acid but also other stain reactions typical for groundwood. This indicates that in both cases the specific group in isolated native lignin and in sprucewood which is responsible for the color reaction, has reacted with the diazomethane and has lost its reactivity and the question arises as to what kind of groups has reacted with the diazomethane. Diazomethane reacts chiefly in two ways: either as a methylating agent, whereby acidic and enolic and, under certain conditions as in the presence of water, some alcoholic hydroxyl groups, are methylated with the liberation of nitrogen and an increase of the methoxyl content by formation of methyl ether or esters; or in such a way that it adds, under certain conditions, to double bonds forming 5-membered nitrogen containing ring compounds of the pryazole and pyrazolidene type with no information of methoxyl groups and a decrease of the latter if such are already present, as in the case of native lignin and sprucewood. The reaction products of native lignin and of sprucewood with diazomethane are practically free of nitrogen and show a considerable increase of the methoxyl content. With native lignin this increase amounts to from 14.8 to 2 per cent; the same value is obtained with the lignin in sprucewood. Willstatter and Freudenberg spruce lignin, methylated and diazomethane with exclusion of water, also has a methoxyl content of 21 per cent. On the basis of a molecular weight of 840 for the lignin-building unit, the increase of the methoxyl content from 14.8 to 21 per cent for isolated native lignin corresponds to the introduction of two new methoxyl groups into the lignin-building unit. If, however, isolated native lignin is methylated in ether suspension with an amount of diazomethane calculated for only one methoxyl group, a partially methylated native lignin is obtained with a methoxyl content of 18.3 per cent. Unlike the partially methylated native lignin with 21 per cent methoxyl, the product with 18.3 per cent is completely soluble in dilute sodium hydroxide solution and still gives the strong color reaction with phloroglucinol and hydrochloric acid. This fact is mentioned because it is needed later to explain reactions in the sulphonation of lignin.

When isolated native lignin is treated with methanol in the presence of 0.5 per cent hydrochloric acid, the methanol immediately condenses with the lignin, forming methanol lignin with a methoxyl content of 21 per cent. This methoxyl content corresponds to two new methoxyl groups in the lignin-building unit and is the same as that of methanol lignin prepared by direct extraction of lignin from sprucewood. In spite of the fact that the methoxyl content of the methanol native lignin and that of the diazomethane-methylated native lignin is almost the same and that in both cases two new methoxyl groups are introduced into the lignin-building unit, the products differ not only in their outer appearance—the methanol native lignin being of light grayish brown, the diazomethane-methylated native lignin almost white—but also in their behavior towards 5 per cent sodium hydroxide solution, in which the methanol native lignin is soluble and the diazomethane - methylated native lignin is insoluble. They differ also in their behavior towards 72 per cent sulphuric acid. While the diazomethane-methylated native lignin is recovered unchanged, the methanol native lignin loses its two new methoxyl groups.

The fact that methanol native lignin, like the methanol lignin prepared directly from sprucewood, is soluble in sodium hydroxide indicates the presence of an acidic hydroxyl group which should be capable of being methylated with diazomethane and indeed, on treatment of methanol native lignin with diazomethane, the methoxyl content increases to 24.4 per cent, the same as previously found on methylation of methanol lignin prepared directly from sprucewood. This increase from 21 to 24.4 per cent corresponds to the introduction of one methoxyl group per lignin-building unit. The same product is also obtained when diazomethane-methylated native lignin is treated with methanol and hydrochloric acid. The introduction of one methoxyl group in both cases proves again that the lignin-building unit must have a molecular weight of at least 840, for if it were only a fraction of this number, only a fraction of methoxyl group would have to be introduced, which is impossible. Further methylation of diazomethane-methylated native lignin and of methanol native lignin leads to two fully methylated native lignin derivatives, the former having a methoxyl content of 30.3 per cent, the latter, 32.3 per cent. The difference of 2 per cent in the methoxyl contents corresponds to one methoxyl group (See Fig. 1).

It may be mentioned that isolated native lignin also reacts with phenol, thiophenol, and thioglycolic acids in a way similar to the lignin in the wood itself.

The question now arises as to how these various reactions of native lignin can be explained. As the result of an extensive investigation of a series of spruce lignin derivatives and their elementary analysis, formula 1 (Table 1) was proposed for the lignin-building unit. This formula was derived from methanol spruce lignin on the assumption that, on treatment of spruce lignin with methanol hydrochloric acid, only one new methoxyl group enters the lignin-building unit. It was also based on the statement in the literature that the methoxyl content of spruce wood is 17.3 per cent. The study of native lignin has shown that both the assumption and the literature are wrong. The methoxyl content of spruce lignin is 14.8 per cent and not one but two methoxyl groups are introduced into the lignin building unit. Although in our earlier work on lignin-building unit with five methoxyl groups was arrived at, this number must now be changed to four. Since it has been known for a long time that the number of hydroxyl groups and methoxyl groups in spruce lignin is the same, the number of hydroxyl groups had to be reduced to four also. The fact that on treatment of native lignin with methanol hydrochloric acid, two methoxyl groups are introduced which, on treatment with 72 per cent sulphuric acid, are split off again, indicates the possibility of the presence of a carbonyl group in the lignin-building unit. While the presence of such a group had been suggested by various workers, its existence was not definitely proved. The fact that native lignin reacts with phenylhydrazine giving a hydrazone with 13.3 per cent methoxyl supports the idea.

The original formula for the lignin-building unit therefore has to be changed in such a way that the hydroxyl group resulting from the fifth methoxyl group and the fifth hydroxyl group of the old formula are in fact one carbonyl group. This carbonyl group is easily enolizable. Native lignin, therefore, can react in two dicerent forms, namely, in its keto form (Formula 2) or its

enol form (Formula 3). The lignin-building unit of native lignin has then 4 methoxyl groups and 4 hydroxyl groups, one of which is phenolic, and one easily enolisable carbonyl group. This formula explains the behavior of native lignin in the various methylation reactions. In its solid state the phenolic hydroxyl group is methylated giving a partially methylated native lignin with 18.3 per cent methoxyl. The free carbonyl group is still capable of giving the phloroglucinol hydrochloric acid color reaction and on ensolisation the product is still soluble in sodium hydroxide solution. In dioxane solution the keto form is enolized and the enolic hydroxyl group is methylated, giving a partially methylated native lignin with a methoxyl content of 21.4 per cent. The carbonyl group has disappeared, the product no longer gives the phloroglucinol color reaction and is now insoluble in caustic soda solution. Methylation with methanol hydrochloric acid gives the methanol native lignin with two methoxyl groups attached to the carbonyl group. Both the diazomethane-methylated native lignin (Formula 4) and the methanol native lignin (Formula 5) have 6 methoxyl groups, but, as can be seen, differently combined. In the former case 72 per cent sulphuric acid has no effect; in the latter case the acetal-like methoxyl groups are split off again. In the methanol native lignin the phenolic hydroxyl group is still free. On methylation with diazomethane the phenolic hydroxyl group is methylated (Formula 6) and the methoxyl content increased to 24.5 per cent. As previously mentioned, diazomethane-methylated native lignin, on treatment with methanol and hydrochloric acid, gives a similar compound with the same methoxyl content (Formula 8) but it cannot be decided at present whether the new methoxyl group is attached to the carbonyl group or to an adjacent carbon atom.

Isolated native lignin is completely soluble in sulphite cooking liquor and the lignosulphonic acid so obtained is now under investigation; it is hoped that more light will be obtained as to the actual reaction taking place between the lignin and the bisulphite. A number of theories have already been offered but they are without experimental proof. It is generally believed that sulphonation of lignin does not occur at temperatures below 100 deg. C. This is not true. An investigation carried out several years ago with Mr. McLaurin showed that lignin as it occurs in sprucewood reacts at room temperature with aqueous sulphurous acid and forms what may be called a solid lignosulphonic acid.. Such a treated sprucewood which was used as a colloidal suspension in order to increase its reactivity has a final sulphur content of about 1.2 per cent, corresponding to about 3.5 per cent based on the lignin in the wood. This sulphur content corresponds to one sulphonic acid group per lignin unit of a molecular weight of 840. A lignosulphonic acid prepared under mild cooking conditions also has a sulphur content of above 3.5 per cent; this seems to be the minimum sulphur content necessary in order to render the lignin soluble. The reason the lignin does not go into solution when sprucewood is treated at room temperature, in spite of the fact that it is sulphonated to 3.5 per cent may be due to one of two causes: either the lignin is chemically combined with some carbohydrate material from which it has first to be split off by hydrolysis which takes place at a more rapid rate only at higher temperatures; or the lignin combined with sulphurous acid by simple addition, forming the so-called solid lignosulphonic acid and this addition compound, at higher temperatures, rearranges with the formation of the soluble lignosulphonic acid. It is also possible, of course, that all three reactions—i. e., addition, hydrolysis and rearrangement—take place. Lignosulphonic acid, in addition to the sulphonic group, has a free phenolic hydroxyl group and for a long time the question was discussed whether this free hydroxyl group is present in native lignin or whether it is first formed during the sulphonation. If the phenolic hydroxyl group is already present in the native lignin, a lignosulphonic acid prepared from a wood meal in which this hydroxyl group is methylated, should have one more methoxyl group than that obtained from an unmethylated wood.

Sprucewood meal, methylated to such an extent that the methoxyl content of its lignin is 21.5 per cent, is subjected to a sulphite cook using ordinary cooking conditions. The result is surprising. The wood meal is recovered in a yield of about 80 per cent. Its lignin content has increased from 27 to 35 per cent, whereas the methoxyl content of the lignin has not changed. The loss of about 20 per cent is the same as when sprucewood is subjected to a mild hydrolysis as mentioned before and the increase of the lignin corresponds to the loss in weight due to the hydrolysis of pentosans and hemicelluloses. A second cook with the same wood meal has no further effect. An analysis shows that the lignin is sulphonated but it does not dissolve. This has been confirmed by Hagglund. About the time this work was concluded, Freudenberg published a paper in which he stated that a sprucewood in which the lignin has been methylated to a degree of 18 to 19 per cent methoxyl, can still be pulped. How can this discrepancy be explained? The following experiments give the solution. As already mentioned, isolated native lignin is soluble in sulphite cooking liquor.

However, when the isolated native lignin is methylated to 21.4 per cent then subjected to a sulphite cook under exactly the same conditions as used in the experiment with the isolated native lignin, the methylated product is completely unchanged and the cooking liquor remains colorless. This confirms the finding that a sprucewood in which the lignin is methylated to a methoxyl content of 21 per cent can no longer be pulped. The lignin in Freudenberg's methylated sprucewood was methylated only to the extent of 18 or 19 per cent. Unfortunately, no exact methoxyl content is given. If we take 18.5 per cent as an average, and since, as mentioned above, methylation of isolated native lignin in suspension gives a partly methylated native lignin with a methoxyl content of 18.3 per cent, it seems that this is the key to the solution of the discrepancy. In both wood meals the phenolic hydroxyl group of the lignin is methylated and in the wood meal with the lignin having a methoxyl content of 21.4 per cent, the hydroxyl group of the enolized carbonyl group is also methylated which prevents the dissolution of the lignin. In other words, the free carbonyl group is essential for the dissolution of lignin in sulphite cooking liquor. As already mentioned, the lignin in the methylated sprucewood is practically sulphonated after the cook and so is the diazomethance-methylated isolated native lignin. An experiment on cooking the isolated native lignin methylated to a methoxyl content of 18.3 per cent only, is in process. This lignin should be soluble and yield a lignosulphonic acid with methoxyl content of about 16.5 per cent and should no longer have a free phenolic hydroxyl group.

The question now arises as to how the formula for the lignin-building unit fits into the reaction mechanism between lignin and sulphite cooking liquor. Table II, formula 1 represents the lignin-building unit in its keto form. This reacts with sulphite liquor to form lignosulphonic acid. It is questionable whether the sulphonic acid group remains at the carbonyl group or, as is more probable, whether the sulphonic group is rearranged, since sulphonic group at the carbonyl group is easily split off again. In an investigation of lignosulphonic acid six years ago with Mr. King, it was found that when a carefully prepared lignosulphonic acid in the form of its sodium salt is methylated with diazomethane, the methoxyl content increases to 19.4 per cent; for six methoxyl groups per lignin building unit, as shown in Formula 4, 19.2 per cent is calculated. When the free acid of the premethylated lignosulphonic acid is further methylated with diazomethane giving seven methoxyl groups, the ulphonic acid group is esterified and the methoxyl content increases to 22 per cent for which the calculated value is 22.1 per cent. Complete methylation of lignosulphonic acid with dimethyl-sulphate and sodium hydroxide gives a methylated lignosulphonic acid with a methoxyl content of 27.7 per cent, a value also found by Freudenberg: for a compound with nine methoxyl groups, 27.6 per cent is the calculated value. It can be seen that this earlier work is in good agreement with the formula for a lignin-building unit of native lignin with a molecular weight of 840. Figure 2 shows the results of four bomb tube experiments. In all experiments, 0.5 g lignin and 25 cc. cooking liquor were used. Experiments 1 and 2 were carried out with isolated native lignin, 3 with diazomethane-methylated isolated native lignin and with a methoxyl content of 21.4 per cent, and 4 with methanol native lignin with a methoxyl content of 21 per cent.

It can be seen that in 1 and 2 the lignin is completely dissolved; in 3 nothing has gone into solution, the product simply softens and on cooling it solidifies again. With methanol native lignin (4) a part has been dissolved, as can be seen from the dark color of the supernatant solution. Since, however, the hydrolysis of the acetal methoxyl groups is very slow, the cook takes much longer. This experiment is under further investigation.

Whereas in the sulphite cooking process, the carbonyl group plays an essential part, the reaction taking place in the soda and kraft cook is still unknown. The study of the sulphite cooking process is facilitated because in this reaction a new element, namely sulphur, is introduced into the lignin molecule. In the reaction between sodium hydroxide and lignin, as used in the soda cook, it is difficult to decide whether the alkali has reacted with the lignin, and if so, in what way. Isolated native lignin is soluble in cold dilute caustic soda and a study of the effect of sodium hydroxide on this lignin at higher temperatures is in progress. In order to dissolve isolated native lignin, 40 grams sodium hydroxide are needed per lignin-building unit, i. e., 840 grams. If this ratio held for the dissolution of lignin in sprucewood with a lignin content of 30 per cent, only 1.45 kilograms of caustic soda would be needed for 100 kilograms of sprucewood. Practice, however, has shown that at least 16 to 18 per cent soda is consumed. A preliminary investigation with Mr. Grimes has shown that the larger part of the caustic soda is consumed by the carbohydrates which are dissolved first, followed by a mixture of lignin and carbohydrates, while in the last stage almost nothing but lignin is dissolved. When Willstatter spruce lignin, which is insoluble in cold caustic soda solution, is subjected to a soda cook under conditions similar to those applied in the soda process, it is completely dissolved and is precipitated again by acificieation and even by carbon dioxide. Unlike the original Willstatter lignin, the alkali Willstatter lignin is again soluble in dilute sodium hydroxide solution and also in dioxane. The methoxyl content is not much changed, indicating that no methoxyl groups have been split off. In the literature, the theory has been advanced that oxygen-containing rings, such as those in coumaran with a furan ring and in flaven with a pyran ring, are present in lignin and are opened by the alkali with the formation of a new phenolic and a new alcoholic hydroxyl group. If this theory is correct, a completely methylated Willstatter lignin also should go into solution, because the methylation of the hydroxyl groups in the lignin should have no effect on the reaction with caustic soda and for each opened ring the resulting product should have two new hydroxyl groups which should be easily detected. When a methylated Willstatter spruce lignin with a methoxyl content of 32 per cent is heated with sodium hydroxide solution under the same conditions as used in the soda process, the product is recovered unchanged, the solution being almost colorless.

In other words, a fully methylated Willstatter lignin is not attacked at all by the caustic soda solution. In this connection, the question arises as to whether the unchanged lignin is wood, after methylation with dimethyl sulphate and sodium hydroxide, would behave in the same manner as methylated Willstatter lignin, or whether the lignin would be dissolved in spite of the covered hydroxyl groups. It is probable that either Willstatter lignin may be changed during the isolation process and therefore behave differently from native lignin, or that the native lignin is combined chemically with other constituents of the wood in such a way that this chemical linkage is broken by alkaline hydrolysis with the liberation of a phenolic or enolic hydroxyl group, thus rendering the lignin soluble. When a methylated sprucewood with a methoxyl content of 35 per cent, the lignin of which has been methylated to 27.5 per cent corresponding to eight methoxyl groups in the lignin-building unit, is subjected to a soda cook, the lignin goes completely into solution. This experiment is still in progress and no details can be given in regard to the lignin. For the time being, the fact is of interest that in the case of methylated sprucewood the lignin dissolves in alkali.

In spite of the fact that sodium sulphide is used in the kraft pulp industry to a large extent, the actual reaction taking place in this process is still unknown and the lignin from such a cook has scarcely been investigated. As sodium sulphide is an alkaline medium, it should react in a way similar to sodium hydroxide and, if an interaction between the lignin and the sodium sulphide takes place, a lignin derivative containing sulphur may result and this may help to clear up the reaction. When Willstatter lignin is cooked with a 10 per cent sodium sulphide solution for one hour at 170 deg., it goes completely into solution, from which it is quantitatively precipitated by mineral acids. The purified product has a methoxyl content of 14.4 per cent and sulphur content of 3.7 per cent. This corresponds to four methoxyl groups and one sulphur atom per lignin-building unit. When sprucewood is cooked with sodium sulphide, the

lignin precipitated and purified, a thiolignin is obtained. This thiolignin has been investgated by Mr. Ahlm who found that it has a methoxyl content of 14.4 per cent, the same as that obtained from Willstatter lignin. When the thiolignin is methylated with diazomethane, three new methoxyl groups are formed, whereas on methylation with methanol and hydrochloric acid, only one methoxyl group is introduced. The sulphur content of the thiolignin is 3.2 per cent, which is about 0.5 per cent lower than the sulphur content of the thio derivative from the Willstatter lignin which had been cooked with a 10 per cent sulphide solution. The lower sulphur content in the thiolignin is caused by the presence of some alkali lignin. The latter is produced by the action of the sodium hydroxide in the cooking liquor which is formed by the hydrolysis of the sodium hydrogen sulphide in the aqueous solution.

This alkali lignin can be separated from the thiolignin by the formation of the mercuric salt of the latter. When this is done, the sulphur content of the thiolignin increases to 3.7 per cent. The fact that thiolignin forms a mercuric salt indicates the presence of a mercapto group in thiolignin. On the basis of the experimental and analytical results, Mr. Ahlm offers the following empirical formula for thiolignin (Table III). Formula I is again the formula for native lignin in its keto form. According to Ahlm, the carbonyl group reacts with sodium hydrosulphide with the formation of a mercapto group as shown in formula 2. Formula 3 shows the thiolignin methylated with diazomethane, formula 4 the thiolignin after treating it with methanol - hydrochloric acid. Formula 5 shows the mercury salt. Time does not permit of a more detailed discussion of the theory of the kraft cooking process, but the following conclusions may be drawn from Mr Ahlm's results. The presence of three groups capable of forming sodium salts—namely the mercapto group, a phenolic and an enolic hydroxyl group per lignin-building unit— may facilitate the dissolution of the lignin. The sulphide in the cooking liquor is necessary for the formation of the mercapto group in the lignin-building unit, while the caustic soda is necessary for the formation of the sodium salt with the phenolic and enolic hydroxyl groups. The optimum ratio of sodium hydroxide to sodium hydrosulphide, according to this formula, would be 2:1 which is what is actually found in the industry. It is obvious that changes in the composition of the wood—i.e., in the content of sugars, tannins, pentosans and hemicellulose which, as already pointed out, are partly dissolved with the consumption of alkali before the lignin is attacked—necessitate changes in the composition of the kraft liquor in order to obtain a pulp with the most favorable properties.

Lignin Problem Not Solved

I thnk we all agree with a statement recently made in a letter to me by Freudenberg, that "the lignin problem is far from being solved." The most important contribution to the solution of its structure made in recent years is the work by Harris who found that, on hydrogenation of lignin, 70 per cent of it is composed of C6-C3 building stones. The question, however, as to how these stones are linked together to form the lignin-building unit is still unanswered. This question will not be solved by theories based on assumptions but only by experimentally proved facts. The sensitiveness of lignin towards oxidation and other reagents makes the solution difficult. Lignin is a jigsaw puzzle in which the results of various experiments are the pieces which have to be fitted together to give us finally the picture of lignin. In order to obtain this picture as completely as possible, many results of various kinds of experiments must be collected. By fitting together the pieces so far obtained, it is possible to detect the shape of one or another piece still missing and to carry out experiments in the right direction to find it.

When finally the whole picture is finished, it may help the pulp and the forest products industry to find a more valuable use for lignin similar to the intense investigation of coal tar which has lead to the foundation of the coal tar dyestuff industry with its valuable products.

Myron Black Visits California

● Myron Black, technical director and sulphite superintendent of the Inland Empire Paper Company at Millwood, Washington, spent the first half of November on a combination business and pleasure trip to California.

Accompanied by Mrs. Black he drove to San Francisco, stopping off to see his alma mater, the University of Washington, learn something about football from Stanford University. Myron reports it was the best football game he has seen even if Washington didn't win.

Mr. and Mrs. Black visited Los Angeles before driving back to Spokane.

MacDonald Receives 40-Year Service Pin

● F. H. MacDonald, one of the real old-timers with the Crown-Zellerbach Corporation, received his 40-year service pin last month, at a dinner given him by a number of his old friends and colleagues. R. A. McDonald, executive vice-president of the company made the presentation.

Kenneth Sherwood, office manager of the Western Waxed Paper Company, Crown-Zellerbach affiliate, recently was awarded his 10-year pin.

We are happy to have served many of you; hope to serve more of you, and wish

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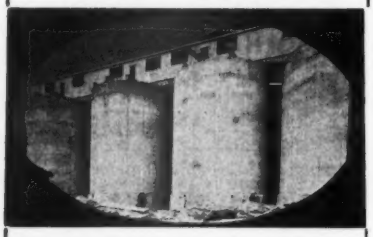

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Rayonier Using Radio To Protect Southern Forests

● Sudden grass fires are the principal menace to growing pine forests in the Southern states. If the fires are minimized the trees grow rapidly, otherwise promising stands are stunted or killed in a few minutes by a grass fire moving rapidly over the flat, open country.

Rayonier Incorporated watches carefully over its thousands of acres of young pine forests in Georgia and Florida which will in years to come contribute a large proportion of the wood required by the company's Fernandina, Florida, mill.

Watch towers are erected at regular intervals throughout the forests. A central short wave radio station is connected by telephone with each tower. The fire fighting trucks of Rayonier Incorporated, as well as the trucks of the Florida Forest and Park Service, are equipped with police short wave radio receiver sets tuned to 2736 kilocycles, and these are constantly turned on.

When fires are located anywhere in the area by towers, the watcher immediately phones the radio station which, in turn, calls over the radio the truck number and name of the patrolman assigned to the area where the fire is located.

If the towerman believes that the fire is two large for one truck, having based his decision upon the volume of smoke, he calls for trucks from adjacent areas.

The Georgia Forest Service with a similar station and facilities at Brunswick, Georgia, serves the Rayonier Huxford Tract at Townsend, Georgia, and the Willson Tract in Camden County, Georgia.

The short wave radio system gives Rayonier two important advantages in fighting fires:

1. Fire crews can be gainfully employed on other work such as thinning, planting, etc., and may be reached without their having to stay close to a telephone.

2. The patrolman, the ranger and the forester, are in constant touch with the fire situation over the entire area.

Portable transmitters are used in some Forest Service trucks for two-way communication between the truck and the radio station.

Reports of German Mills For 1939

● Most of the German pulp and paper mills have submitted annual reports for the business year 1939. In this connection it is reported that the 1938 business results were not always very satisfactory.

During the year 1939 almost all of the reporting companies had to invest considerable amounts for maintenance and modernization, which is understood to have been the consequence of the overtaxation of capacity in recent years, the use of new raw materials, and, in connection therewith, the introduction of new manufacturing methods.

While during the first 8 months of 1939 normal business was carried on by the German pulp and paper mills, the last 4 months often wrought far-reaching changes in the manufacturing program of many mills, these changes often being made on very short notice.

The brisk domestic demand for pulp and paper continued unabated during the year. Exports of pulp prior to the beginning of hostilities could be made only at very low prices, often below the level of 1936. Prices improved after the war started.

During the period under review works operated at capacity and in spite of war conditions the supply of raw materials is reported to have been satisfactory throughout the year. This has been possible, it is said, because of a shift from spruce to other kinds of wood for pulp manufacture, largely through its replacement by beach and by an expansion of sulphate pulp produtcion from fir.

The structural changes, which war economics wrought on the pulp and, especially, the paper industry have been far-reaching and manifold and resulted in an appreciable increase of sales.

The twelve largest German pulp and paper mills with an aggregate invested capital of over 180,000,000 RM reported net profits of 10,100,000 RM in 1939 as against 8,800,000 Reichmarks in 1938. (German mark averaged about $.4006 in U. S. currency in 1939.)

Production figures for paper and pulp for the year 1939 are not available, as their publication during war times is said to be forbidden in Germany. (American Embassy, Berlin.)

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● A simple, accurate and in many instances the only practical and economical means of indicating, recording or controlling process variables remote from the point of measurement is offered by the new Taylor Remote Pneumatic Transmis-

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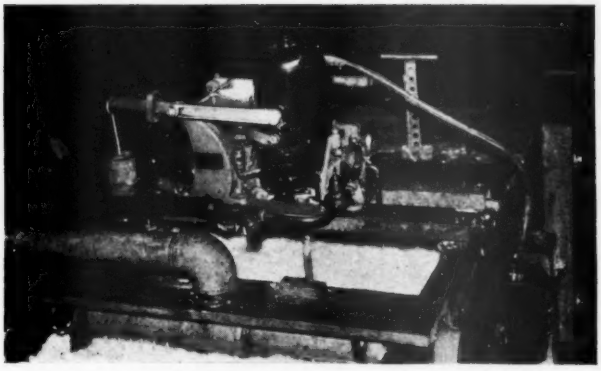

Eight Recent Installations on the Pacific Coast

We Invite Your Inquiries

PACIFIC COAST SUPPLY CO.

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sion Systems. This new system of remote transmission is particularly advantageous where it is desirable to correlate temperature, pressure, flow or liquid level data on a centralized panel or in a control room.

The system utilizes standard Taylor instruments. It may consist of one or two transmitters connected to a receiver; or one or more receiving instruments, not necessarily near each other, and as far as 1,000 feet from the transmitter. Transmitters or receivers may be indicating, recording or controlling types. Air pressure is the transmitting medium, with ¼" O.D. copper tubing as the means of connection.

Taylor Remote Pneumatic Transmission Systems are highly accurate—well within ± 1% of the scale range when properly installed. The speed of response of the receiver to changes in output air pressure from the transmitter is largely dependent upon distance — the maximum lag being 1 second per hundred feet of connecting tubing.

The new Taylor system eliminates the hazards of electrical transmission by doing away with electrical circuits in explosive atmospheres. It measures, transmits and receives continuously regardless of electrical current failures.

For the operator out on the unit, it provides an indicating or recording instrument for observation and eliminates the necessity of returning to the main control board to check the performance of the unit.

Write to the Taylor Instrument Companies, Rochester, New York for Bulletin No. 98156 which describes the many advantages of the systems in the measurement and control of pressure, rate of flow and liquid level.

British Equalizing Newsprint Cost

● Newsprint Supply Company, working through the Director of Newsprint, will equalize the prices of newsprint to British publishers at 26 pounds sterling a ton.

The price fixed in the control of paper order No. 27 issued at the end of November was 28 pounds 10 shillings.

Some months ago, however, all the newspapers through their various associations and with official approval had reached agreement on the equalization scheme which will now become effective.

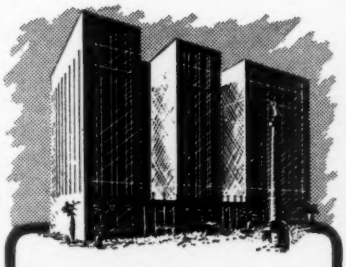
In this way the higher cost of home-produced newsprint will be averaged with the lower priced imported newsprint. That price will be 26 pounds a ton and will apply to all newsprint used by newspapers throughout the United Kingdom.

Management isn't a man, or a group of men, but an idea. It is the idea of co-ordinating the work done by a lot of people so that they can all be better off.—Donald D. Davis.

Japan Importing Very Little Paper

● Japanese imports of paper in the first five months of 1940 amounted to 341 metric tons against 431 metric tons in the same period of 1939.

Exports of paper from Japan in the same period amounted to 72,773 metric tons as compared with 70,815 tons in the first five months of 1939.



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Obstruction of lines—stock and white water lines

Recirculation difficulties—slime growths in recirculated systems

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F-14

Season's Greetings:

The approach of Christmas reminds us again most pleasantly of friends both near and far. Those whose cooperation and loyalty have guided us in the past, and now inspire us for the coming year.

. . . To You All, the Makers of TENAX FELTS extend these greetings:

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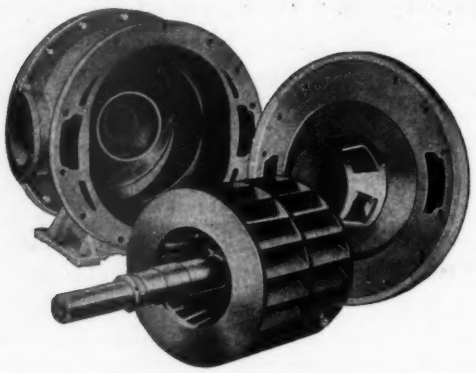

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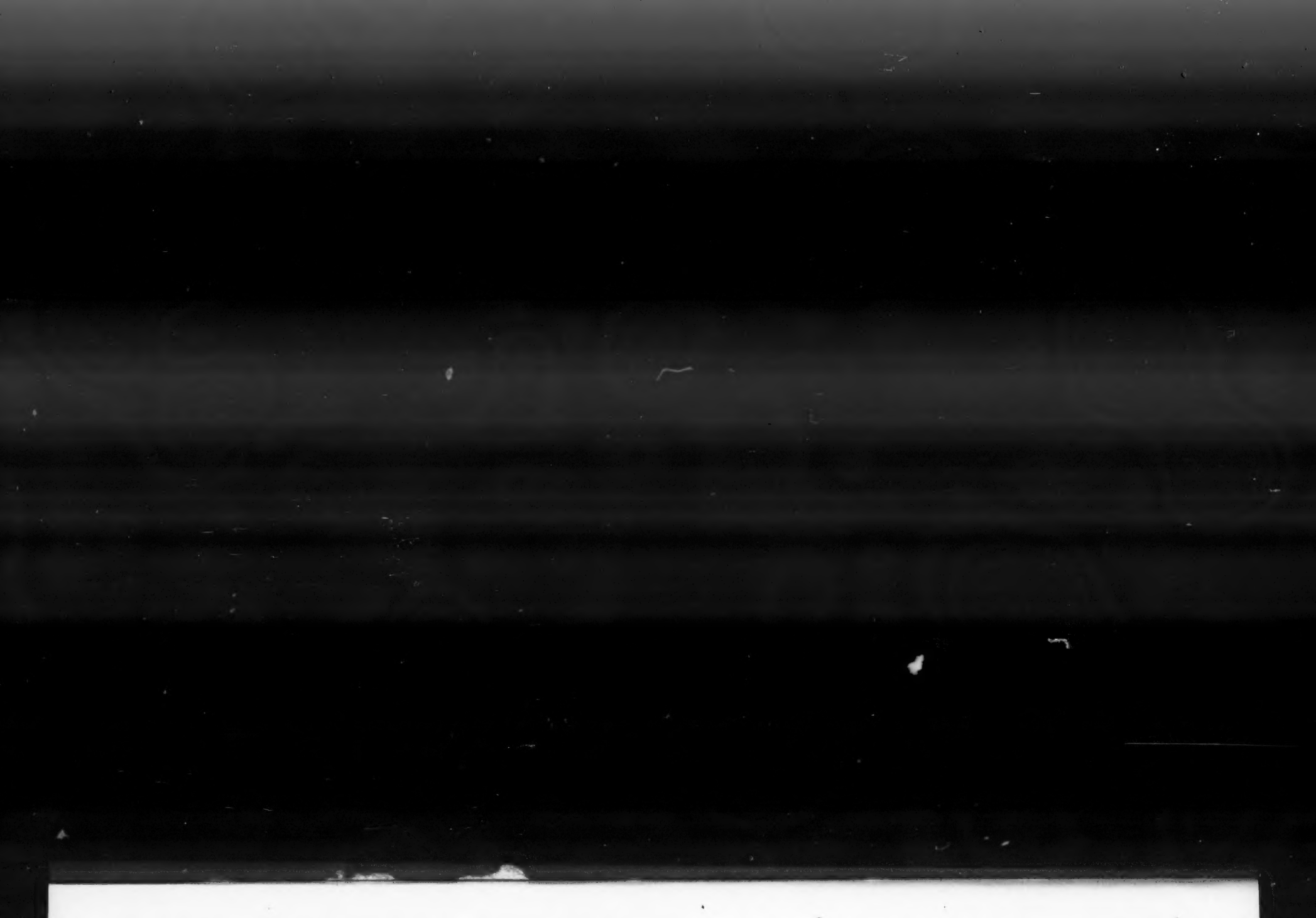
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